Participation in a community-level health intervention

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Statement of Contribution

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Abstract

Physical inactivity is becoming more widespread, and with it, increases in obesity and other co-morbid conditions. Community-level health interventions have been introduced globally to encourage physical activity participation and other positive health choices. It is important to consider what attracts and retains participants, and to examine if the programs positively impact upon their health behaviours. Understanding these factors could assist in greater engagement, sustainability and create long-term behaviour change.

The Australian Government introduced Healthy Community Initiatives in 82 local government areas between 2011-2014 to reduce the risk of chronic disease associated with physical inactivity. The Tablelands Regional Council, in the highlands west of Cairns, Queensland, was one of the councils to implement the initiative. Named 'Wellbeing Tablelands', two of the programs offered under the initiative were light water aerobics sessions and Beat It. The water aerobics program targeted older adults and focused on gentle movement and stretching. The program had one session per week for ten weeks and catered to individuals with limited mobility due to their age. The other program, Beat It, offered two sessions per week over twelve weeks, and catered to those with average as well as impaired mobility. It was more demanding and targeted those at risk of or coping with diabetes.

Participants of these two programs were invited to partake in the current study. The study uses a convergent mixed methods approach to answer the research question 'What are the physiological and psychological factors and the personal experiences associated with participation in the Wellbeing Tablelands HCI programs?'. Qualitative interviews were used to understand the personal experiences of participation in the community-level health interventions, as well as the facilitators perspectives on what they believe the experience of the participant is. Psychometric measures were used for the participants' self-efficacy, self-determination and stage of change. Physiological changes measured included BMI, waist circumference, blood pressure, resting heart rate, flexibility and strength.

Thirty-three participants took part in the program (23 female, 10 male), aged between 47 to 79 years. Four participants took part in the light water aerobics, and the remaining 29 participants took part in the Beat It program. Twenty-five participants were interviewed about their personal experiences of participation in the programs. Four facilitators from the programs and the local council also took part in qualitative interviews to explore their perspectives on program participation. Braun and Clarke's Thematic Analysis was used to guide the qualitative data analysis.

Body mass index, waist circumference, resting heart rate and resting blood pressure were also measured for 29 participants, as well as sit-to-stand, sit-and-reach, leg balance, seated medicine ball throw and six-minute walk. Psychological measures included self-efficacy, self-determination and stage of change. Wilcoxon Signed Ranks Tests were used to assess if there were differences from assessment 1 to 2 for the quantitative data.

There were significant improvements for waist circumference for both genders, as well as the male participants' BMI. There were significant improvements for the female participants' sit-and-reach and sit-to-stand, and the men's seated medicine ball throw. For the psychometric measures, the only score to significantly improve was the autonomous subscale of the treatment self-determination scale, indicating that autonomous motivation to attend the program increased over the duration of the program.

The thematic analysis of the participants' interviews resulted in five themes for the personal experience of participation. These themes were 'Exercise to me', 'Physical benefits of exercise', 'Psychological benefits of exercise', 'Health behaviour barriers' and 'Health behaviour enablers'. The themes of the facilitators interviews were 'Understanding of barriers', 'Program elements as enablers', 'Health advocate enablers', 'Social enablers' and 'Overall impressions'.

The objective of the Healthy Communities Initiative was to reduce the risk of chronic disease associated with physical inactivity however, the results demonstrate that the participants were not necessarily attending for that reason.

The theme common to all participants was appreciation of the opportunity to socialise, and some were also encouraged by changes they noticed in their physiological characteristics. Several participants also had the goal to maintain their current level of physical ability.

Qualitative results also demonstrate that the participants felt more confident with their physical abilities after participating in the program, and they planned on continuing to do physical activity after the program ended. This was despite there not being a significant increase in the psychometric measure for self-efficacy.

There was a discrepancy between the quantitative psychometric measures and qualitative results. While there were no significant improvements for self-efficacy, the participants qualitative data indicated that they felt more confident with their ability, and they desired to continue exercising following the program. Facilitators identified the barriers that participants said were their main barriers to engaging in physical activity, including cost, transport and time; however, it appeared that the facilitators underestimated the health knowledge of participants. The study provides an account of participation in a community-level health intervention, and may contribute to improved program design that is more appealing and relevant to prospective participants.

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Chapter One

Introduction

Community-level health interventions around the world promote healthy eating and exercise to address the rising levels of conditions associated with sedentary behaviour and unhealthy food choices. These programs are often evaluated quantitatively, measuring minutes spent doing physical activity (PA) or number of vegetables eaten per day for example. These quantitative evaluations do not take into consideration the personal experiences of participants. Understanding participants' experiences of partaking in a community-level health intervention through qualitative research can ascertain what keeps participants engaged in the programs and what may be unappealing. It can be difficult for individuals to sustain any new behaviour that requires effort. Intervention participants also may need to be guided in planning how they will continue their new PA behaviours beyond the end of the program. Health behaviour models provide a framework to determine the specific considerations that are needed for individuals to sustain their PA. Ecological systems theory demonstrates the importance of taking into consideration the impact of ecological system levels on development, from relationship with self and close others, through to the larger social structures that impact the life of the individual (Bronfenbrenner, 1979). When taking the ecological model into consideration, participation in a community-level health intervention could potentially be impacted by individual, family, intervention facilitator, community, mass media, and wider cultural system-level factors, amongst others (Bronfenbrenner, 1979). Therefore, examining behaviours of individuals across several of these levels provides a greater overview of the factors impacting the decision to participate. This study combines the qualitative account of participation in a community health initiative with quantitative results from psychometric and physiological measures to produce a discussion about the alignments and discrepancies between the two types of results using convergent mixed methods.

For the purposes of this thesis, health behaviours are any behaviours undertaken by an individual to improve or maintain their physical health. Behaviours that can impact health include PA, diet, smoking (Department of Health, 2018b) and alcohol (Rehm et al., 2010), and factors that can impact health behaviours include mental health (Prince et al., 2007) and socioeconomic status (Ng et al., 2014).

Obesity

Obesity is defined as a BMI of equal to or more than 30 kg/m^2 (National Heart Foundation of Australia, 2018c). In 2014 more than half of the world's 671 million individuals with obesity lived in just ten countries, with the USA home to 13% and China and India combined totalling 15% (Ng et al., 2014) There are patterns for gender by location, with males in the developed world more likely to be obese than females, while the opposite is seen in developing countries, with females more likely to be obese. The combined rates of overweight and obesity rose by 47.1% for children and 27.5% for adults worldwide between 1980 and 2013, and increases were seen in both developed and developing countries (Ng et al., 2014). In Australia in 2014-2015, 63.3% of adults were either overweight or obese, a total of 11.2 million people. This number has increased from 56.3% of adults in 1995 (Australian Bureau of Statistics [ABS], 2015a). For the Tablelands Regional Council area, where the current study takes place, 59.5% of the population is overweight or obese (Queensland Health, 2011).

Obesity is a health concern on several levels, from the individual level through to the national health systems level. Obesity results from a wide array of different health, lifestyle and socioeconomic factors, and yet discussion often focuses on dichotomous causes and solutions such as individual verses environmental causes, personal willpower verses junk food advertising, prevention verses treatment, and personal responsibility verses government actions such as sugar taxes (Roberto et al., 2015). The World Health Organisation (WHO) have warned that the rising public health care costs of treating health conditions associated with obesity have the potential to financially cripple health services around the world (Chan, 2012). In Australia it is estimated that

additional direct and indirect costs associated with obesity will cost the country's health care system $87.7 billion over the years 2015-2025 (PricewaterhouseCoopers, 2015). The continued increase in population obesity, left unabated, also threatens to lower life expectancy in the following decades (Olshansky, Passaro, Hershow, Layden & Carnes, 2005).

The high costs of obesity are due to the co morbidities. Obesity greatly increases the risk of chronic disease, and negatively impacts an individual's ability to deal with these chronic diseases when they do arise. A systematic review and meta-analysis examining the incidence of co-morbidities related to overweight and obesity found significant associations for Type II diabetes, colorectal, kidney, breast, ovarian and endometrial cancer, asthma, gallbladder disease, osteoarthritis, chronic back pain, coronary heart disease and pulmonary embolism (Guh et al., 2009). Primary contributors to the rising rates of obesity include increases in calories and fat intake, a shift in dietary trends that occur when a country's economic situation improves, and to a lesser degree, the increasing rates of sedentary behaviours (Doytch, Dave & Kelly, 2016).

At the individual level, the issue of ideal weight becomes much more complex. Ultimately, each individual has their own idea of what an ideal weight is, and not everyone has control over their weight. For some people, unwanted weight gain is due to medical issues, such as thyroid and hormonal dysfunction (Klok, Jakobsdottir & Drent, 2006), psychological factors associated with weight gain (Ball & Crawford, 2006), and physical limitations that impact the ability to perform PA (Liou, Pi-Sunyerm & Laferre, 2005). Socioeconomic factors, lack of health literacy, and social and environmental factors can also impact weight. For example, it has been demonstrated that weight can be influenced by an individual's social circle, with the individual at greater risk of gaining weight if their friends, family or spouses are overweight or obese (Christakis & Fowler, 2007). Obesity is also heavily influenced by an individual's health behaviours, including some of the behaviours covered in the following section.

Health Behaviours

As stated above, health behaviours are those behaviours undertaken for the purpose of improving health or maintaining current good health. The following health behaviours are those focused on throughout this thesis.

Physical activity.

The terms PA and exercise are often used interchangeably. For this thesis PA will refer to any PA undertaken that raises metabolic rate above that of resting. Exercise will refer to a subset of PA, that being any structured PA undertaken for the purpose of maintaining or improving physical fitness, as per Caspersen, Powell and Christenson's (1985) definition.

Exercise in older adults should include flexibility, balance, and muscle strengthening along with aerobic activities (Nelson et al., 2007). Regularly performing exercise has been shown to improve body composition, glucose homeostasis and insulin sensitivity, blood pressure, chronic inflammation, reduce blood coagulation and improve coronary blood flow and cardiac function (Warburton, Nicol & Bredin, 2006). In frail older adults, exercise has been shown to improve gait speed, balance and the ability to carry out daily activities (Chou, Hwang & Wu, 2012), as well as mobility and physical functioning in older adults with impaired mobility and/or physical disability (de Vries, van Ravensberg, Hobbelen, Olde Rikkert, Staal & Nijhuis-van der Sanden, 2012).

Physical activity also has a positive effect on mental health, which in turn positively impacts upon the prevention and management of cardiovascular disease, diabetes, obesity, and other chronic diseases (Warburton et al., 2006). Older adults who take part in regular PA have higher health-related quality of life scores for the domains of physical function, bodily pain, vitality and social functioning (Acree, Longfors, Fjeldstad, Fjeldstad, Schank, Nickel et al., 2012), as well as decreased depressive symptoms (Salguero, Martinez-Garcia, Molinero & Marquez, 2011) and improved cognitive functioning (Langlois et al., 2012).

The Toronto Charter for Physical Activity advocates that all countries focus at the government level to promote PA and consider this an investment in the health of their populations, due to the economic, sustainable development and health benefits it provides ("The Toronto Charter for Physical Activity",

2010). WHO (2012) listed physical inactivity as the fourth leading risk factor for mortality worldwide, with 6% of deaths worldwide due to a sedentary lifestyle. Physical inactivity and sedentary behaviours lead to increased abdominal and visceral fat, obesity and increased risk for Type 2 diabetes and cardiovascular disease (Gonzales, Fuentes & Marquez, 2017). Obesity itself increases the risk of many other conditions, as discussed above. The Australian Physical Activity Guidelines recommends people of all ages be active on most, or preferably, all days of the week, and for adults under 65 years to complete 150 to 300 minutes per week of moderate activity, or 75 to 150 minutes of vigorous activity, including muscle strengthening two days per week (Department of Health, 2017a). Less than half of Australians achieved this in 2011-2012, with 43% of the population completing at least 150 minutes of PA, 36% completing some PA, and 20% not engaging in PA (ABS, 2013). By not engaging in regular PA, individuals are foregoing the benefits listed above while putting themselves at greater risk of chronic diseases and obesity.

Diet.

The Australian Dietary Guidelines promote high intake of colourful vegetables, whole grains, some fruit, legumes, meat and dairy, and recommend limiting sugar and processed foods (National Health and Medical Research Council, 2013). Most Australians, however, do not meet these current guidelines. According to the Australian Health Survey 2011-2012 nutrition results, only 6.8% of Australians met the recommended intake of vegetables, and only 75% of the population had eaten a vegetable in the 24 hours before being surveyed (ABS, 2015b). Ninety-seven percent had consumed a cereal-based product, 85% had eaten a dairy product, and fruit was eaten by 60% (ABS, 2015b). The lack of fruit intake in Australia contributed 2% to the Australian burden of disease in 2011 (Australian Institute of Health and Welfare [AIHW], 2018a). Unfortunately, 35% of energy intake had been consumed through discretionary foods that should be eaten sparingly, such as sugary treats, sugary baked goods, foods high in saturated fats or salt, and alcohol (ABS, 2015b). Thirteen percent of Australians 15 years and older were on a diet for weight loss or some other health reason when the survey was conducted. The age group with the largest

percentage of dieters was 51 to 70-year old adults, with 15% of males and 19% of females dieting (ABS, 2015b).

Poor dietary choices can have an impact on total disability-adjusted life years (DALY), with a diet low in fruit the leading concern, followed by low intake of vegetables, high intake of processed meat, low intake of nuts and seeds, as well as low intake of wholegrains and fibre. Saturated fats, sugar, salt and red meat all also influence the DALY (AIHW, 2016). Poor nutrition can contribute to increased risk of coronary heart disease, hypertension, stroke, Type II diabetes, gallbladder disease, certain cancers, and non-cancer disorders of the bowel (Crowley et al., 1992).

Smoking.

Tobacco cigarette smoking has been on the decline in Australia, with rates for the population aged 14 years and over falling from 24% smoking daily in 1991, to 12% in 2016 (AIHW, 2018c). Smoking increases the risk of several types of cancers, including oesophageal, stomach, colorectal and lung cancer. It is also implicated in the development and worsening of cardiovascular disease, lung conditions such as asthma and emphysema, decreased cognitive functioning, and the use of tobacco in pregnancy negatively affecting foetal development (U.S. Department of Health and Human Services, 2014). In Australia approximately 19,000 people die per year due to tobacco-related disease, and it is the leading cause of preventable death and disability (Department of Health, 2018b). In 2004-2005 it was estimated that tobacco-related social and economic costs, including healthcare, cost Australians $31.5 billion per year (Collins & Lapsley, 2008).

Alcohol.

Alcohol use in Australia is associated with social and cultural events. In rural communities this association is to such an extent that the problems caused by alcohol abuse will often be overlooked because drinking is considered such an important part of socialising (Allan, Clifford, Ball, Alston & Meister, 2012). Alcohol abuse contributes to alcohol-induced conditions such as pseudo-Cushing's syndrome, foetal alcohol syndrome, degeneration of the nervous

system, liver disease and pancreatitis (Rehm et al., 2010). Alcohol also appears to be dose-response related to conditions including mouth, oesophageal, colon, rectum, liver and breast cancer, tuberculosis, epilepsy, heart diseases, stroke, heart conduction disorders and other dysrhythmias, and lower respiratory infections (Rehm et al., 2010). Alcohol-related problems in 2010 in Australia cost approximately $14.352 billion. The criminal justice system accounts for almost $3 billion of this total, the health care system just over $1.6 billion, approximately $6 billion is due to loss of Australian productivity, and lastly, $3.6 billion from traffic accidents (Manning, Smith & Mazerolle, 2013).

Mental health.

In 2015 four million Australians over the age of 16 years reported a common mental health disorder, which include anxiety, mood disorders and substance use (AIHW, 2018b). The highest rates are among young adults, who often have to deal with establishing careers and families (Department of Health, 2009). Worldwide, the global burden of neuropsychotic disorders is approximately 14% of the total burden of disease, due to the impact these conditions can have on day-to-day living; however, the true burden is likely underestimated due to the failure to acknowledge the connection between physical and mental health (Prince et al., 2007). Mental health is correlated with physical health. Depression and anxiety are correlated with coronary heart disease, obesity and smoking, and depression is also a risk factor for stroke (Prince et al., 2007). Obesity is also associated with bipolar disorder, panic disorder and agoraphobia, and smoking with schizophrenia (Prince et al., 2007). The Australian government spent $9 billion on mental health expenditure in 2015-2016, which is up from $2.9 billion in 1992-1993 (AIHW, 2018b).

Diabetes.

It is estimated that 1.7 million Australians have diabetes (Type 1, Type 2 and gestational), with 1.2 million aware of their condition and approximately 500,000 unaware they are living with the disease (Sainsbury, Shi, Flack & Colagiuri, 2018). The rates appear to increase with age, with rates at 16% for 65-74 year-olds, 10% for 55-64 year-olds and 5% for 45-54 year-olds (AIHW, 2019).

While the rates of diagnosis are similar between metropolitan, regional and remote areas, death and hospitalisation rates in remote areas are twice the rates of those in the city, and those who experience socioeconomic disadvantage experience higher rates of prevalence, hospitalisation and death from diabetes (AIHW, 2019). Diabetes is the fasted increasing chronic condition in Australia, doubling from 3.3% in 2001 (Diabetes Australia, 2015; AIHW, 2019) Diabetes leads to complications including blindness, amputations, and heart disease. It is estimated diabetes costs the Australian health system $14.6 billion per year (Diabetes Australia, 2015).

Health behaviour models

Health behaviour models are used to explain and predict why health behaviours are or are not executed, taking into consideration elements such as internal and external motivations, enablers and barriers, reinforcements, personal beliefs and societal influences. These models tend to be continuum or stage based. Chapter 2 will cover the following selection of health behaviour models in depth, including how they were used in health promotion programs.

The three health behavior models used in this study are Self Determination Theory (SDT) (Deci & Ryan, 2000), Social Cognitive Theory (SCT) (Bandura, 2004) and the Transtheoretical Model (TTM) of health behaviour change (Prochaska & DiClemente, 1983). SDT is a continuum model that proposes that behaviours are goal directed, and motivated by the psychological needs of competence, relatedness and autonomy. It is through understanding these three needs that the outcome of the goal, and the process to get there, can be understood (Deci & Ryan, 2000). SCT, another continuum model, suggests that knowledge and expected outcomes of health behaviours will determine whether someone chooses to engage in health behaviours. The individual's goals, enablers and barriers, and self-efficacy (SE) will also influence engagement (Bandura, 2004). The TTM of health behaviour change includes the Stages of Change model, and is a stage model. Different versions have five (Prochaska & DiClemente, 1983) or six stages (Prochaska & Velicer, 1997). It suggests that for each health behaviour, every person is somewhere along the ordered stages. The

first stage is precontemplation, meaning they are not even thinking about engaging in the behaviour. Then there is contemplation, preparation, and action, through to maintenance, where they have been doing the behaviour regularly for six months or more. In the six-stage model, the final stage is termination, meaning the behaviour has become a habit for the individual. People can move both backwards and forwards through the stages (Prochaska & DiClemente, 1983; Prochaska & Velicer, 1997).

The other models covered in Chapter 2 are the Health Belief Model, Protection Motivation Theory, Health Action Process Approach, Theory of Planned Behaviour, and Self-Regulation Theory. The Health Belief Model, a continuum model, suggests that three factors weigh in to the decision to undertake health behaviour. These are, does the individual feel that they are personally at risk of a health threat; secondly, to what degree could this risk threaten their health; and last, what are the personal costs or barriers to mitigating the threat, compared to the benefits (Rosenstock, Strecher & Becker, 1988). It originated as a model that aimed to predict why people were not getting inoculated against tuberculosis in the 1950's in the USA, and then later for cervical cancer, polio and influenza (Rosenstock, 1974). Protection Motivation Theory, another continuum model, proposes that individuals are ultimately motivated to change their health behaviours by fear of a threat to their health. Individuals will consider how likely the threat is to occur, along with the impact it will have, and take into consideration to what degree a change in behaviour will mitigate the risk, along with costs of changing behaviours (Prentice-Dunn & Rogers, 1986). The theory is often utilized in personal health research, including exercise and diet, smoking, alcohol, AIDS prevention and cancer (Floyd, Prentice-Dunn & Rogers, 2000).

The Health Action Process Approach is a complex model, consisting of both continuum and stage models (Schwarzer & Luszczynska, 2008). It attempts to not only recognise factors of behaviour change, but also predict the likelihood of change using preintentional motivation and postintentional volition processes. The preintentional motivation stage focuses on assessment of risk, and the postintentional volition stage occurs when the individual has decided to change

their behaviour, and has to initiate and maintain their behaviour change. It has been used for behaviours such as smoking reduction as well as dieting in overweight individuals with chronic disease (Schwarzer & Luszczynska, 2008).

The Theory of Planned Behaviour is a continuum model that aims to both predict and explain behaviour (Ajzen, 1991). Behavioural prediction considers intention, actual control and perceived control. The theory suggests that people hold beliefs about health behaviours; beliefs about executing the behaviour; normative beliefs about the behaviour; and belief about their perceived control over the situation. According to the theory, it is through knowing these beliefs that behaviour can be explained (Ajzen, 1991). The Theory of Planned Behaviour has been used for behaviours including exercise, sport participation, diet, smoking, condom use and safe sex, as well as public transport usage and household waste (Armitage & Conner, 2001). Lastly, Self-Regulation Theory is also a continuum model, and posits that an individual's perception of both themselves and the environment will shape their understanding of health threats and behaviours. If a threat is detected, they act to address it, taking into consideration SE, and personal, social and environmental operants (Leventhal, Leventhal & Contrada, 1998). Leventhal et al.'s (1998) version of Self-Regulation Theory in a health context is the Common Sense Model of health threats. It has been used for health threats including irritable bowel syndrome, diabetes, muscular-skeletal injuries, HIV, asthma, epilepsy, chronic fatigue syndrome, osteo-arthritis, heart conditions, cancer and Alzheimer's disease (Hagger & Orbell, 2003).

Australian public initiatives for the promotion of health behaviors

Australia has public health campaigns for each of the health issues addressed above. For diet and PA, the 'Life. Be in it.' campaign is one of Australia's oldest. Running since 1975, and going national in 1977, it promotes the increase of PA for all Australians, and the importance of doing regular PA (Life. Be in it. Funworks, 2018). Beginning as an ad campaign centered around the character 'Norm' who was physically inactive, the organisation now offers events such as walking groups, activity programs for different age groups and

social, school and workplace groups (Life. Be in it. Funworks, 2018). It is no longer a national campaign, but rather each state has its own organisational structures, however, brand recognition remains high, at 90% in 2009 (Life. Be in it. South Australia, 2018). It has transformed from a national-level advertising campaign to state-level organisations offering programs and events that participants can actively engage in, that are accessible to people of different ages and abilities (Life. Be in it. Funworks, 2018).

Australia's Heart Foundation charity has several PA programs to promote exercise engagement and healthy eating. At the school student level there is Jump Rope for Heart, where children skip rope to raise money for the foundation (National Heart Foundation of Australia, 2018a). For the adults, they have the walking programs where people can walk as individuals or in groups, and track their progress and participate in challenges on a phone app. The walking programs have been taking place for over 21 years, with more than 80,000 participants (National Heart Foundation of Australia, 2018b). The walking groups claim to have a participant retention rate well above that of other community-based PA programs, at 78% at 3 years, and attracting groups least likely to exercise including females, people who live alone, those who are older and of lower socio-economic status, and people who are overweight or obese (National Heart Foundation of Australia, 2016).

Swap It, Don't Stop It, was an Australian Government ad-based campaign running from 2008-2011, that encouraged people to think about their food choices, go for smaller portion sizes and try substituting healthier foods in their meals. The impact of Swap It, Don't Stop It was assessed, and it was found that while the campaign did create modest awareness amongst the population, it was not effective at changing eating behaviours for the better (O'Hara et al., 2016).

For smoking there is "Quit for You- Quit for Two" for pregnant females, and "Quitnow" the National Tobacco Campaign, which offers advice and phone apps to help people quit smoking (Department of Health, 2017b). Australia has successfully used strategies such as plain packaging, increasing taxes, and providing subsidies for nicotine replacement therapies to decrease smoking

(Department of Health, 2018b). For alcohol, there is "Drinkwise" which features information for adults, parents and teens about the dangers of drinking alcohol (Drinkwise Australia, 2018). For mental health, the Department of Health has developed a website "Head to Health" that provides users some generic mental health information, as well as links to private and nongovernment organisations that provide mental health resources and help (Department of Health, 2018a). Some of these include BeyondBlue, which focuses on anxiety, depression and suicide (BeyondBlue, 2018); Headspace, which focuses on providing mental health services to people aged 12-25 (Headspace National Youth Mental Health Foundation, 2018); and Lifeline, which offers, amongst other services, crisis support and suicide prevention phone counselling (Lifeline Australia, 2018).

Global community level initiatives for the promotion of health behaviours

Community-level health interventions are conducted globally in an attempt to improve many types of health behaviours. These initiatives often focus on the areas highlighted above. For example, eating, exercise and tobacco use featured in the USA's Department of Health and Human Services "Communities putting prevention to work" during 2010-2013 (Centre for Disease Control and Prevention, n.d.). Other target behaviours for community level initiatives include safe sex practices, such as a program focusing on the male-identified gay community of Quebec City (Godin et al., 2008) as well as immunisation, which Community Health Workers are promoting in Kenya (Nzioki, Ouma, Ombaka & Onyango, 2017).

Given the threat that physical inactivity poses to health, initiatives worldwide have also focused on improving PA levels. Chapter 3, the systematic review, examines several PA-based community-level health interventions from around the world that were explicitly based on theoretical models of behaviour change. These programs demonstrate that globally, including Australia (Heatherington, Borodzicz & Shing, 2015), USA and Norway (Jenum, et al., 2006; Jenum, Lorentzen & Ommundsen, 2008), countries are utilising community health initiatives to try and address the increasing concern about physical inactivity.

Healthy Community Initiatives

One such Australian initiative to target physical inactivity is the Healthy Community Initiatives (HCI). The focus of the Australian Government-supported HCI was to encourage being active, along with healthy eating and lifestyle choices. Seventy-two million dollars was invested in the HCI, which ran in 82 local government areas from all around Australia from 2010 to 2014. The HCI utilised social marketing strategies, physical health and nutrition education, as well as structured exercise programs, to engage the communities. The HCI from this thesis was Wellbeing Tablelands from the Tablelands Regional Council on the Atherton Tablelands, a rural area in the hinterland west of Cairns, in Queensland, Australia. Wellbeing Tablelands held community health expos to engage the whole community, with stalls, presentations and activities. Other engagement opportunities included PA programs open to the whole community, such as one that was held at the local showgrounds where anyone could participate in running and ball skills for an hour in the afternoon over several weeks. There were also closed programs, including the two water aerobics programs that are used in this thesis.

The two HCI programs in the current thesis offered swimming pool-based exercise classes. One water aerobics program was held once per week for 10 weeks. The other water aerobics program was held twice per week for 10-12 weeks and targeted adults either living with or at high risk of developing diabetes or chronic disease. The program was facilitated by professional trainers who were responsible for helping participants improve their health through education, awareness and PA. Socialising was promoted as an important part of the program, and it provided individuals with the opportunity to meet others in similar situations to themselves, and to motivate each other. Individual levels of ability were recognised, with participants encouraged to work at their own pace, and build confidence.

According to the HCI Quality Framework, program proposals had to outline goals of the program and how they would monitor outcomes and evaluate it. Programs had to be evidence based, and in line with national

Australian health guidelines. It stipulated that community demographics, including cultural and socioeconomic status, be taken into account in the design and implementation of the program, with the aim of extending reach to more potential participants. (Department of Health, 2010). While the HCI was not explicitly based on any psychological model of health behaviour, the intention of Beat It at the national level was to assess current stage of change (SOC), perceived barriers and assist with goal setting to deliver tailored interventions to participants (Department of Health, 2012).

Statement of the research problem and significance of the study

Community-level health interventions are delivered worldwide by governments in an attempt to reduce the threat inactivity and obesity pose to their health systems, yet to date, there has been a lack of research regarding the personal experiences of participation in these interventions. In particular, why do participants choose to engage in the interventions, what keeps them motivated to attend, and do these reasons for engagement and attendance align with the governments' intentions and focus. This study examined the personal experience of participation in government-funded community health initiative programs in rural locations on the Atherton Tablelands. These programs aligned with the guiding principles of the Toronto Charter, including targeting both the population as a whole, as well as sub groups; reducing socioeconomic barriers to PA, addressing the determinants of PA, and implementing strategies that are sustainable across multiple levels and sectors to achieve the greatest impact; conducting research, training and capacity building, and; taking a life-stage and culturally sensitive approach ("The Toronto Charter for Physical Activity", 2010).

People living in rural locations have limited access to organised exercise programs, and those that are offered may not cater to the individual health concerns of all their participants. The programs advertised the benefits of PA, however, it is unknown how personally relevant these promoted benefits were to those who took part, particularly given participants were aged 47 to 79, with different physical abilities. While previous research exists on the effectiveness of exercise programs for various chronic illnesses (Knols, Aaronson, Uebelhart,

Fransen & Aufdemkampe, 2005; Sigal, Kenny & Wasserman, 2006), and larger quantitative studies assess engagement in community-level health programs (Department of Health and Ageing, 2007), the experiences of the community-level health intervention participants and facilitators remains largely unexplored. The study aims to understand the benefits of participation, why participants continued in the programs, and what role PA played in their everyday lives from the participants' viewpoint. It examines how suitable the participants felt their program was, and if it met their expectations. This thesis aims to demonstrate whether participants benefit from engaging in the programs, not only health-wise, but possibly in ways that were not necessarily predicted by the original programs' expected outcomes.

This thesis examined the health behaviours associated with participation in the Wellbeing Tablelands HCI programs. The research aimed to answer the research question: 'What are the physiological and psychological factors and the personal experiences associated with participation in the Wellbeing Tablelands HCI programs?' A convergent mixed method approach was used to answer this question.

Qualitative research questions.

To understand the personal experiences of participation in the Wellbeing Tablelands HCI program, the qualitative questions are:

- What are the participants' experiences of partaking in the Wellbeing Tablelands' programs?
- How does participation impact upon their health behaviours?
- What are the facilitators' perceptions of participation, and are they congruent with those of the participants' accounts?

Research hypotheses.

The study utilised quantitative measures to determine if the physiological and psychological characteristics of the participants changed through participation in the program. The three research hypotheses are:

- The anthropometric measures of participants will improve through participation in the program
- The physiological measures of participants will improve through participation in the program
- The psychological measures of participants will improve from participation in the program

Delimitations of the study.

The findings of this research are delimited to:

1. The participant sample; older adults living in lower socioeconomic rural areas on the Atherton Tablelands who either have or are at risk of chronic disease
2. The specific programs conducted with the particular cohort and the facilitators

Limitations of the study.

Conclusions drawn in this study are limited by the following:

1. Self-reporting of PA behaviours
2. Limited sample sizes for the quantitative research
3. Validity and reliability of measurement tools
4. Control of testing procedures
5. Risk of socially desirable answers from participants
6. Risk of socially desirable answers from facilitators, given they are performing in a professional role when interviewed

Definition of terms.

The following terms are used throughout the thesis:

1. Body Mass Index (BMI). The classification of body weight calculated by dividing kilograms by height in meters squared.

2. Physical Activity (PA) and exercise. Physical activity is classified as any bodily movement resulting in energy expenditure, and exercise is any planned PA done to maintain or enhance physical health. These terms are used interchangeably in the qualitative results section, reflecting the participants' usage of the words, interchanging the two.
3. Waist circumference (WC). Measure of the narrowest point around the waist.
4. Beats per minute (BPM). Measure of how many times the heart beats in one minute.
5. Resting heart rate (RHR). The BPM while the individual is calm and rested.
6. Healthy Community Initiatives (HCI). Local government area health promotion initiatives funded by the Australian Government aimed at improving the health behaviours of all community members.
7. Health behaviours. Any behaviour undertaken to maintain or improve physical health.

Abbreviations

The following abbreviations are used regularly throughout the thesis:

1. Self-determination (SD)
2. Self-determination Theory (SDT)
3. Self-efficacy (SE)
4. Stage of Change (SOC)
5. Transtheoretical Model (TTM)
6. Social Cognitive Theory (SCT)

Summary

Healthy community initiatives were implemented by the Australian government to promote health behaviours including PA and healthy eating. What is not known, is what physiological and psychological factors are associated with participation in these programs, as well as what is the personal experience of participation in a community-level health intervention.

Physical inactivity and unhealthy eating choices, along with other unhealthy behaviours, increase the morbidity and mortality rates of Australians, which places financial strain on the national health system. Despite the health benefits of engaging in regular PA, most Australians do not meet the recommended levels. Asking participants why they chose to engage in PA programs provides a greater understanding of what attracts and retains participants and could provide strategies and recommendations for future programs.

The aim of this study is to determine what health behaviours are associated with participation in the Wellbeing Tablelands HCI program that was conducted on the Atherton Tablelands for older adults either with, or at risk of, chronic disease. Quantitative measures were used to determine physiological and psychological factors. Thematic analysis was used to examine the experience of participation in the HCI from the participants' and facilitators' perspectives.

Chapter Two

An overview of some of the available theoretical models of health behaviour is provided here, including the three used in this thesis: TTM's SOC, SDT and SCT, which encompasses SE. All the models detailed in this literature review provide frameworks with which the motivations and reasoning for engagement in health behaviours can be explained.

Theoretical models of health behaviour

Theoretical models are generated from research on health behaviours and health self-regulation and aim to explain why people achieve positive health behaviours. The research examines what factors are involved in behaviour change, how these influence change, and what differentiates those who change from those who do not. Models of health behaviour provide a framework for the explanation and prediction of behaviours, and can be used to inform both the design of interventions and the measures to assess health behaviour (Schwarzer, Lippke & Luszczynska, 2011).

The two main types of models are continuum and stage models. Continuum models guide explanation and prediction, whereas stage models are more suited to informing interventions (Schwarzer et al., 2011). Continuum models include the Theory of Planned Behaviour and Protection Motivation Theory. Continuum models place individuals along a continuum depending on individual predictor variables. These predictor variables predict the likelihood of an individual engaging in a behaviour and aim to explain what is required to invoke behaviour change. These models, created to guide people to action, do not take into account that individuals may be at different stages of readiness to change (Schwarzer et al., 2011).

Stage theories categorise the target group into homogenous groups depending on their readiness to change. Behaviour change techniques can then be tailored to the specific needs of each group based on their stage of readiness to change. The stages are ordered, with individuals moving through each stage in order as they advance, although it is recognised that individuals can relapse. The TTM by Prochaska and DiClemente (1983) is one of the most well-known

examples. The following eight models are examples of stage and continuum models commonly used in health promotion programs.

Health Belief Model

The Health Belief Model (HBM) is a continuum model that proposes that behaviour change is contingent on the perceived personal benefits of the change (Rosenstock, Strecher & Becker, 1988). The model suggests that several factors weigh in to the execution of health behaviour modification. The first factor is personal awareness and relevance of the issue; does the individual believe they are personally susceptible to the threat? The second factor is the perceived level of threat, or to what degree does the individual feel the issue threatens their personal health. Thirdly, the individual will consider the personal costs or barriers, as well as the benefits of changing behaviour, to address the threat (Rosenstock et al., 1988).

SE (Rosenstock et al., 1988), cues to action and health motivation are also considered to influence behaviour, although they are not recognised in all studies (Carpenter, 2010). SE was added in 1988 by Rosenstock, Strecher and Becker, as an explanatory variable that could also be manipulated. SE provides an explanation for why individuals may not engage in health behaviour change, despite understanding that doing so could benefit them. A lack of SE means the individual does not have the confidence to effectively change their behaviour. Cues to action includes both external cues, such as instruction from a health provider, and internal cues, such as a health problem (Carpenter, 2010). Health motivation is overall motivation to change behaviour (Carpenter, 2010).

Carpenter (2010) conducted a meta-analysis of 18 longitudinal studies that assessed the four main factors of the HBM (susceptibility, threat, barriers and benefits) to determine whether the HBM is a reliable predictor of behavioural outcomes. It was found that most studies use the four-variable version of the HBM. Findings indicated that benefits and barriers of behaviour change were consistently the strongest predictors of outcomes. Time elapsed between pre- and post-measures for susceptibility, severity and benefits variables moderated their predictive power. Carpenter concluded that the four

variable HBM should not be used as a tool to predict health behaviour, but rather moderation and mediation between the variables could be considered.

Protection Motivation Theory

Protection Motivation Theory (PMT) is a continuum model that aims to explain and predict behaviour (Prentice-Dunn & Rogers, 1986). The model proposes that when individuals consider changing behaviour, they make threat and coping appraisals, with fear ultimately motivating change. A threat appraisal involves assessing the severity the threat of a disease poses, as well as the chances of the disease occurring. A coping appraisal involves deciding if the protective behaviour will be effective in stopping the disease, and if executing the behaviour is possible.

A meta-analysis by Milne, Sheeran and Orbell (2000) investigated the usability of the PMT to predict behaviour for interventions, and to be used in intervention design. It was found that both coping and threat appraisal could predict behaviour, however, coping showed greater validity and threat appraisal was demonstrated to be a poor predictor. The model was also more effective at predicting concurrent behaviour than future behaviour. Health-related intentions were significantly correlated with subsequent behaviour, providing support for the PMT as a model that stresses the influence of intentions on behaviour.

Health Action Process Approach

The Health Action Process Approach (HAPA) consists of both a stage and continuum layer. The two layers allow for the model to better predict behaviour and identify factors of behaviour change (Schwarzer et al., 2011). Some models recognise intention of behaviour change but they fall short of being able to predict actual behaviour change, known as the 'intention-behaviour gap'. HAPA attempts to overcome this problem by employing postintentional mediators. It does this by separating the process of behaviour change into two stages, the preintentional motivation process and the postintentional volition process. The HAPA proposes that during the preintentional motivation process stage the risk of not changing behaviour is considered, but acknowledgement of risk is not

enough to motivate change on its own. This is because motivation to change requires the assessment of the behaviour change outcomes and SE. When positive outcomes are expected and SE is adequate, there is a greater chance of behaviour change (Schwarzer & Luszczynska, 2008). When intention to change behaviour is present, the individual moves into the postintentional volition stage. The postintentional volition stage concerns the execution and ongoing maintenance of behaviour change, which requires self-regulation (Schwarzer & Luszczynska, 2008). The HAPA includes factors that are not addressed by other models such as social support, action control, planning, and recovery SE (Schwarzer et al., 2011).

Studies have been done to assess the HAPA's ability to predict behaviour and be used for program design. For predicting behaviour, one study examined the exercise behaviours of 195 individuals with multiple sclerosis. SE and planning variables both significantly predicted exercise behaviour, with the model explaining 38% of behaviour variance (Chiu, Lynch, Chan & Berven, 2011). A study by Scholz, Keller and Perren (2009) investigated the performance of the HAPA at the intrapersonal level with 265 participants, with physical exercise intention and self-reported exercise behaviour as the main outcome measures. The model was confirmed for the within-person level. SE and outcome expectancies were positively associated with intentions for exercise, but risk awareness was not. Exercise was associated with intentions, SE and action control, but not action planning.

A pre-post test study was conducted to assess vaccination rates during an influenza outbreak in Thailand (Payaprom, Bennett, Alabaster & Tantipong, 2011). Participants in the treatment population were given the opportunity to use the HAPA model to plan their vaccinations, and the control population was given standard government-issued information. Those who received the HAPA information demonstrated greater change in their risk perception, outcome expectancies, SE and intention to be vaccinated compared to the control group. Despite the differences, there were no significant differences between the two groups in vaccination rates. Vaccination was predicted in both groups by SE and intention (Payaprom et al., 2011).

Transtheoretical Model

The TTM by Prochaska and DiClemente (1983), which encompasses the Stages of Change model, addresses problem-behaviour change. It proposes six stages of behaviour change (however, there are different versions, including some with five stages, as used in this thesis), with each stage defined by level of motivation and readiness to change (Prochaska & Velicer, 1997). The six stages are:

- Precontemplation- the individual is not considering undertaking behaviour change
- Contemplation- the individual is contemplating behaviour change
- Preparation- the individual is planning how to undertake behaviour change
- Action- the individual initiates their behaviour change
- Maintenance- the individual actively maintains their behaviour change
- Termination- the behaviour is now standard for the individual

The TTM suggests that individuals can and often will, relapse and move between stages before reaching the stage of termination, if they reach termination at all. Ten behaviour change processes involved in the modification of behaviour are employed at particular stages (Kim, 2007). These ten processes consist of cognitive processes, which the individual realises through their actions, and behavioural processes, which are linked to tangible events. Cognitive processes include dramatic relief, consciousness raising, environmental reevaluation, self-reevaluation and self-liberation. Behavioural processes include stimulus control, counter-conditioning, social-liberation, reinforcement management and helping relationships. In addition to these processes, SE and decision-balance (the weighing of costs verses benefits) are the psychological constructs associated with exercise (Kim, 2007).

In reviewing previous smoking-cessation research, Prochaska, Norcross and DiClemente (2013) noted if individuals can move from their current stage into the next within the first month of a behaviour change intervention, their chances of reaching the action stage within six months doubles. This demonstrates the importance of recognising the different stages; for example, if someone in the contemplation stage was able to reach the preparation stage within the first month, they have a better chance of successful behaviour change than if they were coached to attempt the action stage before they were ready and consequently failed to move from the contemplation stage (Prochaska et al., 2013).

Several studies have investigated how the three psychological constructs- behavioural processes, SE and decision-balance- are used at each stage of the model, and what influence they have on exercise behaviour. Kim (2007) conducted a cross-sectional study with 228 Korean college students. Behavioural processes were the key variable for explaining exercise behaviour, both as an entire construct and as the four individual processes of counter conditioning, helping relationships, stimulus control and reinforcement management. Different constructs were associated with different stages of change, with SE and decision-balance positive outcome levels lower in the precontemplation and contemplation stages, than in the action and maintenance phases. In contrast, the decision-balance negative outcomes were higher in the first and second stages compared to the fourth and fifth stages. It was also found that the psychological constructs of SE, processes and decision-balance could be used to classify individuals into their current stage for exercise behaviour. The classification of those in the precontemplation stage using the psychological constructs was the most accurate, at 78.3%, and then the maintenance stage at 75.0%. The average accuracy of classification across the stages was 61.0%.

The results of Kim's (2007) study are supported by Horiuchi, Tsuda, Watanabe, Fukamachi and Samejima (2012). This study inquired about the normal exercise behaviour of 457 factory workers in Japan, with a pre-post test questionnaire that asked about exercise behaviours over three months. It was found that SE fluctuated throughout the stages, increasing from

precontemplation to action, levelling off at action through to maintenance, and then increasing again from maintenance through to termination. Decision-balance outcomes changed from precontemplation to action, with positive outcomes increasing and negative outcomes decreasing.

Fallon, Hausenblas and Nigg (2005) investigated the psychological constructs associated with the later stages of change model, including temptation, decision-balance, processes of change and SE. Gender differences were found for the constructs. Females, for example, were found to acknowledge greater positives of exercise, and were more likely to utilise cognitive and behavioural processes in their behaviour change efforts. Males demonstrated greater efficacy to deal with barriers to exercise. There was no difference between genders for negatives of exercise or temptations to not exercise. Belief that exercise efforts would benefit not only themselves, but family and friends, appeared to be important to both males and females, along with high SE. For men, dealing with negative affect is important to be able to progress to the later stages, whereas for females the focus needs to be on confidence to overcome barriers to exercise.

Johnson, Paiva, Cummins, Johnson, Dyment, Wright et al. (2008) used the TTM to design a 12-month randomized control trial (RCT) intervention, with 1277 overweight or obese adult participants in the United States. Participants in the treatment group received home-based minimal interventions tailored to their current stage, for three or less weight-related behaviours, including healthy eating, exercise and management of emotional distress without eating. The study was the first to establish the effectiveness of a home-based multiple-behaviour intervention for weight control. The results demonstrated that those who progressed to the action/maintenance stage for one of the three behaviours were two-and-a-half to five times more likely to progress one or more stages for another of their three behaviours.

Hall and Rossi (2008) conducted an analysis of 120 studies that used the TTM to assess 48 different behaviour changes. They found that the different

behaviours were all changed in similar ways in accordance with the TTM, providing support for the use of the TTM as a model of behaviour change.

Two studies in Chapter 3's systematic review utilised the TTM in the design and reported the results. The Study of Exercise and Nutrition in Older Rhode Islanders (SENIOR) project tailored print-based materials to the participants' individual TTM stages, and it was found that were already at either the action or maintenance stage at baseline were more likely to complete the program. There was no difference between intervention and control groups on SOC however, or resulting PA levels. Romsas in Motion (Jenum et al., 2008; Jenum et al., 2006) focused on promoting PA and increasing SE during their program, and found that there was a favourable intervention effect for SOC as a result. Chapter 3 goes into these studies in much greater detail.

Each of these studies indicate that interventions that consider the TTM and its constructs can engage participants in effectively address their individual needs. The TTM can also provide an explanation for why participants have or have not experienced positive outcomes from interventions.

Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) (Ajzen, 1991) is a continuum model that is concerned with predicting and explaining behaviour within context. To predict behaviour it uses three behavioural factors; behavioural intention, actual behavioural control and perceived behavioural control. Behavioural intention refers to the individual's motivations and intentions to perform a behaviour, whereas actual behavioural control refers to the individual's capability of conducting the behaviour. Perceived behavioural control is how much control the individual believes they have over the behaviour, regardless of intention or actual control. Perceived behavioural control is an important factor because it can influence the likelihood of attempting behaviour, more so than actual control. Perceived control and intention can therefore be used to predict behaviour. The TPB also attempts to explain behaviour, and suggests that all behaviour results from personal beliefs regarding behaviours in context. These personal beliefs are behavioural,

normative and control beliefs. Behavioural beliefs pertain to opinions about conducting a behaviour. They are generated from considering the costs, benefits and expected outcomes of a behaviour. Normative beliefs stem from perceived subjective norms of a behaviour. Therefore, the expected reactions of others are considered by the individual. Control beliefs are related to perceived behavioural control, and can be shaped through factors such as past experiences with the behaviour and feedback from others who have attempted it.

A meta-analysis of 237 studies was conducted by McEachan, Conner, Taylor and Lawton (2010) which investigated the TPB's ability to predict health behaviours. Results indicated that overall, TPB could explain 19.3% of the variance for behaviour and 44.3% of behavioural intention. Previous behaviour and intention were both shown to be strong predictors for performing a behaviour. Physical activity and dietary behaviours as moderators of performing a behaviour were also assessed. They were considered to be effectively described by the model, at 23.9% and 21.2% respectively. Intentions were the primary predictor of behaviour engagement.

Self-Regulation Theory

Self-Regulation Theory (SRT) (Leventhal, Leventhal & Contrada, 1998) is a continuum model that proposes that recognition of health issues is subject to the individual's perception and construction of themselves and the environment. The individual senses health threat cues, such as a physical symptom, decides if it poses a threat to them and sets a goal to address the issue, which results in action. The coping strategy devised takes into account environmental, social and personal feedback, and individual perceived efficacy.

The individual representation of illness is central to SRT (Leventhal et al., 1998). Representations are considered on two levels, content and organisation. Content includes the health threat identity (the disease and its symptoms), time-line of the duration of threat, causes (infection, injury), consequences (both real and imagined), control over the threat, and the ability to resolve it. Organisation includes the nature of the duration of the threat. An acute threat poses no long-term concerns and is dealt with only briefly, cyclical conditions are issues that

return with some regularity after resolving the threat, for which Leventhal et al. provides the example of a seasonal allergy, and then there are chronic conditions that are ongoing and can be life-long (Leventhal et al., 1998).

Threats are also recognised by both their title, such as giardia or a broken bone, as well as by their symptoms, such as stomach upset, or pain and limited mobility. SRT suggests that when individuals address threats, they can address either the label or the symptoms. If the threat is giardia then the individual can choose to treat the label (the disease itself) with antibiotics, or the symptoms, by keeping fluids up. Individuals assess coping strategies by considering the consequences of the strategies, time-lines and expected results. The risks and benefits are also weighed in when coming to a final decision (Leventhal et al., 1998).

A study by Ward, Donovan, Owen, Grosen and Serlin (2000) assessed an RCT that aimed to enable more effective use of analgesics for cancer patients compared to the standard care offered. The intervention involved the use of an information booklet covering usage and barriers of pain medication and its side effects, as well as a discussion about these issues with a nurse. The intervention addressed cognitive and emotional representations of pain medication usage, as well as coping appraisals, which can be barriers to optimal use. No significant differences in medication usage was found, however, the researchers believed that awareness of the study may have primed the control group to investigate effective pain medication on their own.

Self-Determination Theory

SDT as proposed by Deci and Ryan (2000) is a continuum model that suggests behaviours are regulated by different motivational cues and performed to satisfy psychological needs. SDT aims to identify what motivates a behaviour, and what either maintains or diminishes this motivation. SDT details two different types of processes, the 'content' process of the outcome and 'regulatory' process, which is the process of attaining the goal, and suggests that they influence motivation differently (Deci & Ryan, 2000). The need to satisfy the innate psychological needs of competence, relatedness and autonomy through

behaviour to achieve psychological growth, well-being and integrity, also provides motivation.

SDT also recognises that there are two types of motivation, intrinsic and extrinsic. Intrinsic motivation is driven, or self-determined, by the individual and engaged in wholly by choice. Intrinsic motivation is influenced by three factors; autonomy, competence and relatedness (to the individual). Extrinsic motivation is induced by drivers external to the individual, such as social or environmental influences. Sense of autonomy in extrinsic motivation can vary, as individuals can often recognise gains resulting from extrinsically motivated behaviour. SDT aims to explain how extrinsically motivated behaviours can evolve to become self-determined intrinsic behaviours, and the role the social environment plays (Deci & Ryan, 2000).

SDT proposes that motivation lies along a continuum, from amotivation through to intrinsic. Amotivation is the driver of impersonal behaviour of which the individual has lack of control. Extrinsic motivation consists of four defined levels of regulation. These four levels are moving from external towards (but not making it yet to) intrinsic motivation, and are: external, introjected, identified and integrated. External motivation results in behaviours performed to comply with external pressures. Introjected motivation results in behaviour performed where there is some sense of self control and some internal ownership. Identified motivation results in personally important, valued behaviour, and integrated motivation results in behaviour that individuals feel is driven by an internal locus of causality but is still a response to external influences. At the opposite end of the continuum to external motivation is intrinsic motivation, which is motivation the individual has complete control over, resulting in self-driven behaviour (Deci & Ryan, 2000).

SDT is concerned with how extrinsically motivated behaviours become intrinsically motivated. It suggests that relatedness, a sense that the behaviour will create a sense of belonging with others, is one important way. Competence is another factor, as competence in behaviour is valuable in a social setting. Lastly, autonomy assists the individual in recognising that behaviours are intrinsically

regulated, completed by choice and performed for the purpose of reaching a personal goal. It is these three factors that enable genuine personally-driven behaviour (Ryan & Deci, 2000).

A meta-analysis conducted by Teixeira, Carraca, Markland, Silva and Ryan (2012) looked at the role of SDT in physical activity. Results indicate that the development of autonomous regulation, be it intrinsic, identified or integrated regulation, will promote exercise behaviour. Intrinsic motivation was also found to be important for maintaining exercise behaviour in the long-term. Well-internalized extrinsic motivations were found to be beneficial when initiating behaviour change. Levels of autonomous behaviour were also found to predict engagement in exercise. Concerns were raised about the current trend of public health initiatives promoting exercise for its 'medicinal' properties such as weight regulation, instead of promoting the opportunity it provides for enjoyment and socialisation. If people find enjoyment in the activity, they are more likely to develop intrinsic motivation and continue the behaviour (Teixeira et al., 2012).

Silva, Vieira, Coutinho, Minderico, Matos, Sardinha and Teixira (2010) assessed an RCT weight loss and exercise promotion intervention for females, which aimed to increase autonomous exercise and intrinsic motivation. There was significant weight loss for the intervention group and greater physical activity undertaken, suggesting that interventions based on SDT produce greater results compared to a general health education program.

Social Cognitive Theory

SCT is a continuum model that asserts that health behaviour is determined by knowledge of recommended health behaviours, outcome expectations of behaviour, health goals, perceived SE, and perceived facilitators and barriers (Bandura, 2004). These constructs work in the same way as those that have been described in the models above. A search of Australian community-level health initiatives that target obesity found two that have used SCT as a framework.

'Healthy Dads, Healthy Kids', a six-month RCT, enlisted overweight and obese fathers and their primary school-aged children, with the aim of having

fathers model healthy behaviours for their children (Morgan et al., 2011). The program focused on addressing perceived facilitators and barriers to exercise, and increasing SE for maintaining a healthy diet. Fathers in the treatment program lost a significant amount of weight and significantly improved PA, but there was no significant improvement for diet.

The Healthy Lifestyle Program was an RCT that targeted women, particularly, mothers of school-aged children (Lombard, Deeks, Ball, Jolley & Teede, 2009). Social cognitive constructs referenced included goal setting, social support and addressing barriers and relapse. During Phase 1 of the program once-a-month workshops were held for the treatment group over four months and included advice about dietary goals, exercise and the self-monitoring of behaviour change. Social support was encouraged, through engagement in program-organised walking groups. For the control group, a single health education session was provided. No significant differences were found for changes in exercise behaviour or fat intake for the treatment group. While there was a significant amount of weight lost pre- to post-test for the treatment group, there was no significant between-groups difference.

One of the studies included in Chapter 3's systematic review also utilised SCT's SE. Becofsky, Baruth and Wilcox's, (2014) study assessed two programs, Active Choices (AC) and Active Living Every Day (ALED). The two programs were structured differently, with AC being phone-call based, lasting 6 months, with limited contact to once per month over the final 4 months. ALED was a small group intervention that ran for 20 weeks. For both programs there was a significant relationship between the increase in SE and an increase in PA.

Conclusion

Programs that aim to deliver 'quick fix' solutions for behaviour change do not acknowledge different stages of readiness to change and the underlying complex psychological and physical conditions that have previously enabled unhealthy behaviours and limited healthy ones. Taking psychological factors and readiness to change into consideration may enable programs to better address the particular needs of the individual, thereby increasing the chances of long-

term behavioural change success. The personal experience of weight bias and stigma should also be considered when targeting individuals who are overweight, particularly as studies demonstrate that stigmatising messages and failure of consideration of personal circumstances can alienate potential target group participants (Thomas, Lewis, Hyde, Castle & Komesaroff, 2010).

Thomas et al. (2010) suggest that further research investigating how individuals interact with and respond to different interventions is needed to develop more effective interventions. The focus should move away from weight loss as the main outcome measure, to implementing viable long-term healthy lifestyle changes, suitably tailored to the individual.

Previous research examining the efficacy of theoretical models of behaviour in programs highlights some important points about the use of models in programs. A meta-analysis of RCT theory-based interventions found that theory-based interventions based on SDT, SCT, TTM, TPB or a combination of these do impact PA levels, and that those programs that utilised only one theory showed better results than those that used a combination of theories. There was also no significant difference when it came to what theory was used (Gourlan et al., 2016). Another meta-analysis examined the use of models, as well as the use of behavioural strategies. It found that while the use of models in the design produced only negligible differences for an increase in PA, including actual behavioural change strategies and social-ecological restructuring in the program produced better outcomes (Rhodes, Janessen, Bredin, Warburton & Bauman, 2017). This highlights that while the incorporation of models may help, it comes down to how they are incorporated and how they create behaviour change as to how effective they are.

This thesis investigates the role of SE, self-determination (SD), stages of change and the personal experience of health promotion programs, to highlight the importance of these factors being considered and addressed in programs. Future research concerning the effective elements of weight-targeted initiatives is needed to inform the design of programs, if these programs are to successfully

instigate long-term health behaviour changes that significantly benefit participants.

The following chapter, Chapter 3, is a systematic review that discusses community-level health interventions that have utilised psychological models of behaviour. It examines what models were used, and how they were used throughout the design, implementation and assessment of the programs.

Chapter Three

Systematic Review: Community-level health interventions that have utilised psychological models of health behaviour.

This systematic review has been included in the study to provide an overview of other community health initiatives from around the world that have included psychological health behaviour models. It discusses to what degree the models have been utilised in the initiatives, and how, if at all, these were effective for creating behaviour change. Several of these results are then linked to the final discussion chapter of this thesis.

Introduction

Non-communicable chronic disease (NCD) rates are rising around the world, largely in part as a result of sedentary lifestyles and the prevalence of unhealthy food choices (Beaglehole, et al., 2011). Preventive health interventions are recommended to try and address the rising rates and their associated costs (Beaglehole, et al., 2011). The current and projected burden this will have on health systems globally is predicted to elevate health care costs to an unmanageable level for many countries that have rising obesity and preventable chronic disease rates (WHO, 2017). Recognising this risk, community-level health interventions have been implemented to promote positive health behaviour change. These interventions target a variety of NCD such as Type II diabetes, CVD, and osteoporosis, as seen in the programs reviewed here.

To achieve health behaviour change, the integration of psychological models of health behaviours into programs can provide frameworks for targeting behaviours and measuring whether the psychological factors related to health behaviour change have occurred. This review considers programs that have previously used psychological models, how they have done so, and how successful they are in producing health behaviour change. Literature searches did not return a review that looked specifically at how models had been integrated into the programs, and how the utilisation impacted outcomes. This information can guide the future design and implementation of community-level health programs to increase their chances of success.

The aim of this review was to explore the use of behaviour change theoretical models to inform community level health interventions that targeted increasing physical activity. Specifically:

- Did the models explicitly inform the design of the intervention (did the assessments and intervention match up with the model)?
- Did they produce better outcomes if the model was used throughout?
- Which model was the most successful?

Methods

Search strategy.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRSIMA) guidelines were used to guide the search strategy (Figure 1) (Moher, Liberati, Tetzlaff & Altman, 2009). Data searches took place in March 2017, in PsychInfo and Medline (Ovid). The literature search focused on articles published between 1997-2017 to ensure currency of information. PsychInfo search terms were "((SU.EXACT("Health Behavior") AND community AND (health promot*) AND SU.EXACT ("Exercise")) AND (SU.EXACT("Adult") OR Adult)". Medline search terms were "[[Community.mp AND Health Behavior/ AND health promot*.mp AND Exercise/] OR [(health promot* adj8 (exercise or "physical activ*")).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] AND community.mp]] AND [Adult/ or adult.mp]".

Inclusion criteria.

Studies had to meet the following criteria to be included:

- Open to all adult community members to apply (study not excluded if health screenings prevented some individuals from joining, or if RCT meant they were allocated to different treatment groups).

Included if open to one specific ethnic group within a community, or large age group, for example 50 years and over

- Utilisation of a published psychological behavioural theory in the design and/or implementation of the program

- The program had to target increasing physical activity to improve health, no matter the final health outcome assessed (weight or diabetes risk, or bone health etc)

- Outcomes had to be focused on individual physical health outcomes (not mental health outcomes). The reasoning for this is to ensure that the participants primary motivation is to increase physical health. For programs that focus on mental health outcomes, the motivations of participants to partake may have been different, and therefore, results could not be compared equivocally

- Published in English

Of the full texts that were screened, 55 were excluded because they did not meet the inclusion criteria of being open to all adults, as they allowed for only females or families with children, they were RCTs where not everyone had access to the treatment at some point, the programs took place before the 20 year cut-off, with the work being published much later, and some suggested they used psychological models in the abstracts or titles, but did not in the design of the program (Figure 1). Of the eleven papers, there were two that referred to the SENIOR study (Clark et al., 2005; Greaney et al., 2008) and two that reported on the Romsas in Motion (Jenum et al., 2008; Jenum et al., 2006). These papers have been presented under their common program in the results for ease of presentation, so while there are 11 publications, there are 9 programs discussed.

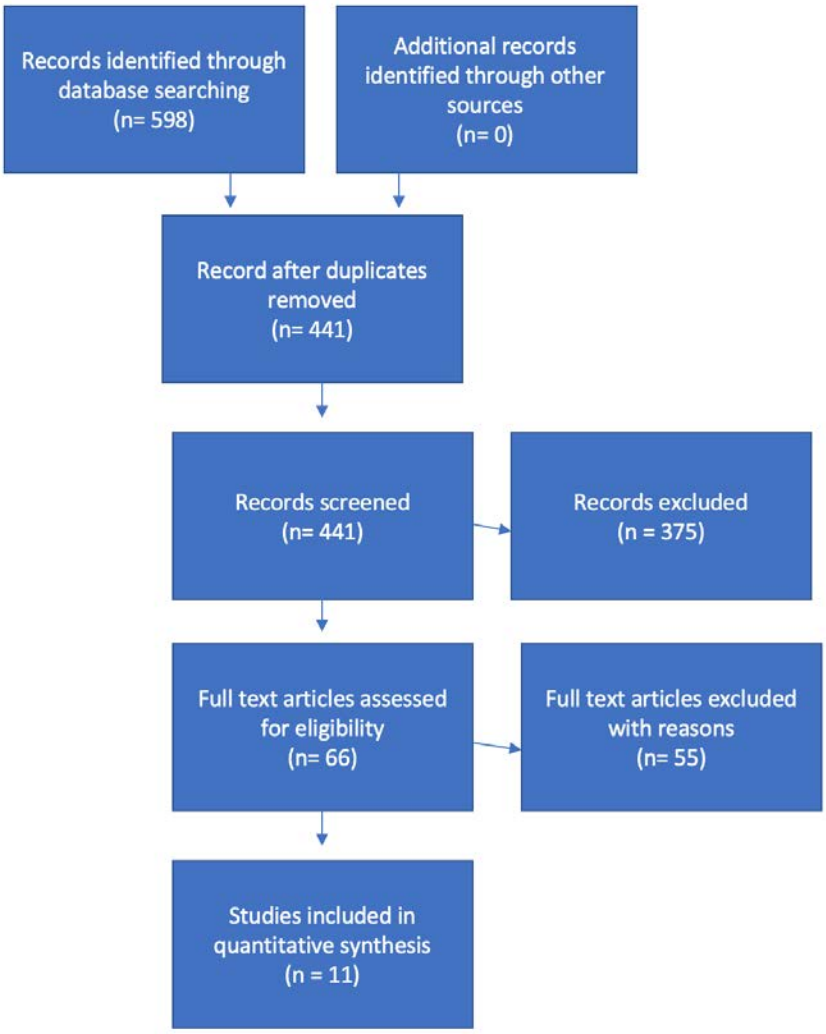

Figure 1. PRISMA flow diagram for article screening (PRISMA, 2009).

Quality assessment.

The studies were analysed for methodological quality according to guidelines of the McMaster University Occupational Therapy Evidence-based Practice Research Group (Law et al., 1998). The articles were summarised and the following information was extracted from each article: the intervention/program, including the design, participant numbers, intervention duration; recruitment criteria; sample sizes; outcome assessment tools used; results; drop outs; the study purpose; the psychological model and strategies used; conclusions and implications.

Results

The eleven studies reviewed included nine interventions, with two papers contributing to information on the Romsas in Motion program (Jenum et al., 2008; Jenum et al., 2006), and two to the SENIOR project (Clark et al., 2005; Greaney et al., 2008). The McMaster tool (Law et al., 1998) provided some insight into the quality of the studies. While it is generally advised against using an overall score, looking at the different domains within the scoring demonstrate which studies have scored better in terms of design, presentation of results and conclusions drawn.

The two highest-scoring interventions were the SENIOR project (Clark et al., 2005; Greaney et al., 2008) and the Williams et al. (2011) randomised control trial (RCT), with both losing marks in intervention description and design only. The next four highest scoring interventions were Active Choices, Active Living Every Day (Becofsky et al., 2014), 10 Keys to Healthy Ageing (Robare et al., 2011), Walk Your Heart to Health (Schulz et al., 2015) and the Bone health program (Plawecki & Chapman-Novakofski, 2013). All four of these also lost marks for their intervention description and design, as well as sample method for Walk Your Heart to Health (Schulz et al., 2015), lack of detail regarding dropouts for Becofksy et al. (2014), and lack of introduction to the study for Robare et al. (2011). Sumter County On The Move! (Schoffman et al., 2015) and Romsas in Motion (Jenum et al., 2008; Jenum et al., 2006) both came in next, losing marks again for intervention description and design, as well as limited introduction for Schoffman et al. (2015), and limited information regarding sample size and methods for Romsas in Motion (Jenum et al. 2008; Jenum et al., 2006). Finally, Healthy Eating and Lifestyle program (HEAL) (Heatherington et al., 2015) lost marks for intervention design, lack of outcome measures and dropouts not being discussed.

Study design.

Active Choices (AC), Active Living Every Day (ALED) (Becofsky et al., 2014), 10 Keys to Healthy Ageing (Robare et al., 2011) and Sumter County On the Move! (Schoffman et al., 2015) were all Before and After designs. HEAL (Heatherington et al., 2015) was a cohort design, and Romsas in Motion (Jenum et al., 2008; Jenum et al., 2006) was a pseudo-experimental cohort design. The

remaining programs, SENIOR project (Clark et al., 2005; Greaney et al., 2008), Bone health program (Plawecki & Chapman-Novakofski, 2013), Walk Your Heart to Health (Schulz et al., 2015) and Williams et al. (2011) were randomised control trial designs where participants did have access to treatment at some point during the design. Program duration was between eight weeks (Heatherington et al., 2015; Plawecki & Chapman-Novakofski, 2013), and three years (Jenum et al., 2008; Jenum et al., 2006).

Cohort.

Participant numbers ranged from 69 (Plawecki et al.2013) to 2827 participants (Heatherington et al., 2015). For the studies that reported gender, the majority of participants were female, comprising from 59.4% in 10 Keys of Healthy Ageing (Robare et al., 2011) to 90% in Walk Your Heart to Health (Schulz et al., 2015). Seven studies reported participant age, with mean ages ranging from 46.7 years (Schulz et al., 2015) to 75.2 years (Clark et al., 2005; Greaney et al., 2008). Only two studies reported body mass index (BMI). Becofsky et al.'s (2014) participants had an average BMI of 30 kg/m^2, while participants in the Romsas in Motion program had an average BMI of 26.8 kg/m^2 for females and 27.5 kg/m^2 for males (Jenum et al., 2008; Jenum et al., 2006).

Intervention.

All of the interventions included the aim of increasing PA, with eight of the nine programs aiming to increase PA for the sake of increasing PA as a health outcome in itself, with the exception of Plawecki and Chapman-Novakofski (2013) who aimed to increase PA to improve bone density for osteoporosis prevention and treatment. Five of the studies focused primarily on PA (Becofsky et al., 2014; Jenum et al., 2008; Jenum et al., 2006; Schoffman et al., 2015; Schulz et al., 2015; William et al., 2011), with the remaining four including nutrition (Clark et al. 2005; Greaney et al., 2008; Heatherington et al., 2015; Plawecki & Chapman-Novakofski, 2013; Robare et al., 2011).

Williams et al. (2011) was a print-based intervention, and both the SENIOR project (Clark et al., 2005; Greaney et al., 2008) and Romsas in Motion (Jenum et al., 2008; Jenum et al., 2006) included print-based materials as a main

resource in their interventions. Active Living Every Day (Becofsky et al., 2014), HEAL (Heatherington et al., 2015), Brief Education and Counselling Intervention (BECI) Plus (Robare et al., 2011), Sumter County On the Move! (Schoffman et al., 2015), and Walk Your Heart to Health (Schulz et al., 2015) all had some element of group participation in their programs, while Romsas in Motion had walking groups and indoor activities available, but these were not compulsory (Jenum et al., 2008; Jenum et al., 2006). Active Choices (Becofsky et al., 2014), the SENIOR project (Clark et al., 2005; Greaney et al., 2008), and 10 Keys to Healthy Ageing (Robare et al., 2011) utilised counselling, whether by phone and/or in person, in their programs.

Psychological model used.

The TTM was the most common psychological model used, which featured in five programs (Becofsky et al., 2014; Clark et al., 2005; Greaney et al., 2008; Heatherington et al., 2015; Schoffman et al., 2015; Williams et al., 2011). SCT was used in three of the studies (Becofsky et al., 2014; Schoffman et al., 2015; Williams et al., 2011) while SCT's predecessor, Social Learning Theory (SLT), was utilised by one (Robare, 2011). Schoffman et al., (2015) and Jenum et al., (2008, 2006) also targeted SE, a construct of SCT. Schulz and colleagues' (2015) program was informed by social support interventions and group dynamics theories, however, they did not provide further detail. Jenum et al. (2006) was informed by social-psychological and ecological perspectives on behaviour change and included empowerment and participatory approaches. The bone health program intervention (Plawecki et al. 2013) was based on the Health Belief Model (HBM) and the Theory of Reasoned Action (TRA).

Outcome measures used.

Of the nine programs, two had no measures to assess the outcomes on the theoretical constructs utilised in the designs of their studies (Heatherington et al., 2015; Schulz et al., 2015). Robare et al. (2011), which used SLT and goal setting, measured social contact and depression, as well as PA behaviour, but did not detail the link between the measurement outcomes and theoretical models used. Two of the studies based the programs on the TTM, but only measured SE

(an element of TTM), and not the SOC as well (Becofsky, et al., 2014; Schoffman et al., 2015). The final four programs used appropriate measures to comprehensively test the efficacy of the theoretical foundations of the programs. The SENIOR project measured SOC for exercise, SE, decisional balance and process of change (Clark et al, 2005; Greaney et al, 2008). Romsas in Motion measured SOC, social support, SE and attitudes, perceived control and PA identity (Jenum et al., 2008; Jenum et al., 2006). Plawecki and Chapman-Novakofski's (2013) bone health program included a 66-item questionnaire that included HBM, TRA, SE, barriers, norms, intentions and attitudes towards calcium and vitamin D, along with PA. Williams et al., (2011) had SOC, processes of change, SE and decisional balance, social support and PA enjoyment. Six of the studies measured social interaction and/or support (Becofsky et al., 2014; Jenum et al., 2008; Jenum et al., 2006; Robare et al., 2011; Schoffman et al., 2015; Schulz et al., 2015; Williams et al., 2011).

All of the studies measured physical activity as an outcome. Measures included the Active Australia Survey (Heatherington et al., 2015), the 41 item community health activities model program for seniors questionnaire (Becofsky et al., 2014), the Yale PA survey (Clark et al., 2005; Greaney et al., 2008), a modified activity questionnaire (Robare et al., 2011), duration of PA for both leisure and work commuting (Jenum et al., 2006; Jenum et al., 2008), pedometer (Schulz et al., 2015) and accelerometer counts (Schoffman et al., 2015), activity log (Plawecki et al., 2013), and 7-day PA recall (Williams et al., 2011).

Outcomes of programs.

Although the program outcomes are quite different due to the different aims, there were some common elements. Of the nine programs, Schulz et al.'s (2015) Walk Your Heart to Health and Heatherington et al.'s (2015) HEAL program did not report any psychological measure changes, as none were used, despite their programs being based on psychological theoretical models. They reported PA behaviour change, and Heatherington et al. also reported changes in dietary behaviour. The remaining studies reported at least several of their

psychological measure results related to the theoretical model their program was based on, and all the studies reported changes in PA behaviour.

SE was significantly related to behaviour change in several studies. In Becofsky et al. (2014) in both AC and ALED there was a positive significant relationship between the number of classes attended and SE, and increased SE was significantly related to increased PA per week. The SENIOR project (Clark et al., 2005; Greaney et al., 2008) found that those with higher SE at the beginning of the program were more likely to complete the program. The bone health program (Plawecki et al., 2013) had significant improvements pre-to-post test for dietary SE in both the treatment and control groups.

The TTM and the SOC (a component of the TTM) were collectively reported in three programs. In the SENIOR project (Clark et al., 2005; Greaney et al., 2008), it was found that those who completed the program were more likely to have been in the action or maintenance phases of SOC at baseline. There was also no difference in final SOC between the control and intervention groups, with the exception of those in the intervention group who were in precontemplation at the beginning of the program. For Romsas in Motion (Jenum et al., 2008; Jenum et al., 2006), there was a significant favourable intervention effect on SOC, with a greater percentage of participants being regularly active at the end of the program, and less being inactive. For Williams et al. (2011), those who were doing some PA at baseline were significantly more likely to achieve the 150 minutes of PA per week at 12 months than those who were not doing any PA at baseline, although the stage these participants is at is not explicitly stated.

Social support was found to be significantly positively related to the amount of PA undertaken in Becofsky et al., (2014), Plawecki et al., (2013), Schoffman et al. (2015) and Williams et al. (2011). Walk Your Heart to Health (Schulz et al., 2015) was a program based on social support, and while there were no social support measures used, those in the social support program did significantly more steps than those in the control group.

Table 1

Overviews, outcome measures used and results of programs

Study	Design	Intervention	Outcome measures of interest used	Results
Becofsky et al., 2014	Before and After Active For Life, consisting of: Active Choices: 6 months, with data taken from three runs of the program over 4 years N=709 Active Living Every Day: 20 weeks, run three times over 4 years (12 weeks in the final year) N=849	Active Choices: • Utilises SCT, SOC • Phone call based • Calls tailored to individual SOC, SCT • Initial face-to-face, followed by bi-weekly calls for first 2 months • Monthly calls final 4 months Active Living Every Day • Utilises SCT, SOC PA small group intervention over 20 weeks	• Social support 5-item scale, previously developed for large US study, derived from Sallis et al. • PA SE measured by 5-item scale by Marcus, Selby et al. 41-item Community Health Activities Model Program for Seniors questionnaire	• AC o Significant positive relationship between phone calls conducted and change in SE o Increased SE and social support significantly related to increased PA o Increased SE explained approx. one-third of effect of program attendance on change in PA • ALED o Significant positive relationship between classes attended and change in social support and SE o Increased SE and social support significantly related to increased PA hours per week Reduction in perceived stress and depressive symptoms
Clark et al. (2005)	RCT	• Utilises TTM • Four groups	• TTM constructs o SOC for exercise questionnaire	• Those who completed the study were more likely to be in the action or

And Greaney et al. (2008)	Study of Exercise and Nutrition in Older Rhode Islanders (SENIOR project) 12-month intervention, followed by 12-month observation N=1274	o increase fruit/vegetables o increase exercise o increase fruit/vegetables and exercise o contact comparison group • Coaching calls, individually TTM-tailored print-based materials Contacted monthly over a year	o SE 6-item o Decisional balance ten item o Process of change 30 item • Physical activity behaviour: Yale PA survey YAPS • Physical function: timed up-and-go test • Diet group: NCI Fruit and Vegetable Screener, 9 item, including portion size • Survey from 5 a day (FAD) studies, 7 item. • Single item "how many fruits and vegetables do you eat each day?"	maintenance SOC at baseline, and have higher SE • No difference between control and intervention on SOC (with the exception of those in precontemplation) • Group assignment had no effect on SE, decisional balance and process of change, PA behaviour, physical function • No difference for TTM constructs, except for exercise pros at 24 months • No significant differences between intervention and comparison groups for PA or physical function
Heatherington et al. (2015)	Cohort design Healthy Eating Activity and Lifestyle program (HEAL) 8 weeks N=2827	• Utilises TTM (and SOC) • Australian group-based program targeting those with or at risk of non-communicable chronic disease • 1-hour moderate PA and 1-hour health education each week	• Anthropometric measures • PA questions based on Active Australia Survey • Fruit, vegetable, fat and fibre intake • No TTM measures	• No theoretical outcomes to report • Significant improvements on all variables for average score of all those who completed the program • Numbers meeting recommended PA guidelines increased from 40% to 55% • 97% intended to maintain new PA and eating habits
Jenum et al. (2008)	Pseudo-experimental cohort	• Utilises social-psychological and ecological perspectives on behaviour change, including SOC (also	• SOC, social support for PA. SE for PA, attitudes towards PA, perceived control over PA and PA identity	• Significant favourable intervention effect on SOC, perceived control, social family support and identity

And Jenum et al. (2006)	Romsås in Motion 3 years N=1766	states SE, but this is under SOC) • Norwegian PA promotion program tailored primarily towards physically inactive people aged 30-67 years • Print-based materials and mass media promote benefits of PA; individual counselling for SE and behavioural control during biannual fitness tests (very little information provided on how program was actually run) • Organised free walking groups and indoor activities	• PA in leisure time and work commute • Anthropometric measures	• Statistically significant increases in PA for both genders and decreases in inactivity • Less of a BMI increase in the intervention group than the control • Results for SE not reported
Plawecki et al. (2013)	RCT Bone health program 8 weeks N=69	• Utilises HBM and TRA • One-hour lectures once a week focusing on osteoporosis prevention and treatment, including diet and PA	• 66 item questionnaire based on Osteoporosis Health Belief Scale, modified to include HBM and TRA constructs, including SE, barriers to change, norms, intentions and attitudes towards calcium, exercise and vitamin D • 16-item demographics and health	• No significant difference in activity for both control and treatment • Significant improvements pre- to –post test for benefits of diet and exercise, dietary SE for both control and treatment. • Significant improvement for susceptibility to osteoporosis and barriers to dietary change for treatment group • TRA constructs: o 3 significant equations explain variance in dietary calcium

			• Calcium-Focused Food Frequency Questionnaire • Activity log	intake behaviour: attitude of adequate intake being important (23%); attitude of dietary calcium being important and SE of choosing fortified over non-fortified (33.5%); knowing someone with osteoporosis o 2 significant equations for intention to exercise with friends/family: subjective norms of "friends/family encourage activity" and "daily activities being enough" (38.7%) with intention to include exercise with friends/family in the next 3 months. o With dependent variable, intention to increase daily activity in next 3 months, daily activity, family and work account for 26.3% • Attitude 'vitamin D dietary intake is important' explained 13.6% for lowering disease risk • No significant equations for exercised-based attitudes and subjective norms
Robare et al. (2011)	Before and After design 10 Keys to Healthy Ageing 2 years	• Utilised SLT and behaviour modification-goal setting • Two groups o Brief education and counselling intervention (BECI): 10	• Centre for Epidemiologic Studies Depression questionnaire • Number of times person had social contact per week, but no link discussed to SLT	• No significant change in prevalence of depressive symptoms • PA levels dropped, even in intervention group, no significant difference between groups • Some significant changes in some health behaviours, such as reduction in salt in hypertension group, lowering

	N=389	initial weekly sessions, then monthly for motivation and adherence. Included nutrition, exercise, goal setting, problem solving. Phone call with Health Counsellor every 3 months, meet every 6 months to review plan. • BECI Plus: BECI plus walking and weight programs via 24 one-hour small group sessions over 12 weeks, encouraged to do PA outside this. Sodium intake information provided, weight loss encouraged for those > BMI 30	• Anthropometric measures and PA behaviour measures that are linked to their 10 Key goals	LDL cholesterol and improvements in bone mineral density
Schoffman et al. (2015)	Before and After Design Sumter County On The Move! 6 months	• Utilised SE, TTM, SCT • Group leaders recruited through study, they then recruit their own friends, into a social walking group	• 5-item SE Scale for exercise • 14-item version of Social Support for Exercise Scale • PA measured by 10 hours of accelerometer data in one day	• Social support from friends significantly increases days of the month of Outside Recreation Area use for PA, both cross-sectionally and longitudinally • Cross-sectionally, this increase was also seen for social support from family and from group, as well as for SE

	N=259			
Schulz et al. (2015)	RCT Walk Your Heart to Health 32 weeks N=695	• Informed by Social-Ecological model • Utilises group dynamics theories and informed by social support interventions • Group-level intervention, focusing on social support and cohesion • Health assessments at baseline, 8 and 32 weeks • Lagged control group design (8-week lag)	• Participation and adherence to program • No psychological model measurements	• At week 8, intervention group recorded significantly more steps per day than the lagged group • Those who participated more had significantly greater step counts • No discussion of psychological models
Williams et al. (2011)	RCT Print-based PA intervention 12 months N=248	• Utilises TTM and SCT • Treatment group exposed to 5 additional SCT constructs • Participants received both tailored and non-tailored print materials at months 1-6, 8, 10, 12. Goal setting also used to different degrees across both groups	For both groups: • Interview administered 7-day PA recall, anthropometric measures • PA SOC • PA processes of change measure • SE 5 item PA measure • PA decisional balance instrument For treatment: • Social support for exercise scale	• With covariates controlled, the treatment group had 46% and 50% greater odds of meeting 150mintes per week of moderate-to-vigorous PA at months 6 and 12, respectively, but this is not significant • Participants who reported some moderate-to-vigorous PA at baseline were significantly more likely to meet the 150 min/wk at 12 months than those who were completely sedentary • Social support showed significant increases in treatment group compared to controls, at months 6 and 12, suggesting targeting it may have produced the favoured PA trends in that group

		• 9-item outcome expectations scale • PA enjoyment scale	• Were not expecting any differences between groups for psychological model factors (which was the result), as they were targeted in both programs

Discussion

Community initiatives that used different theoretical models of PA behaviour were reviewed to determine if different models impact outcomes, and what psychological factors are correlated with improved PA outcomes. The studies were assessed to see if their use of psychological models informed the programs, if there was significant behaviour change, and if these targeted psychological factors were assessed as outcomes. Some of the programs utilised the theoretical models throughout their entire programs, from design to final data collections and conclusions, whereas others only used them to inform the design of the program.

Use of theoretical models throughout programs.

Theoretical models were used to different extents in the design, implementation, data collection and evaluation of these programs. While this review assessed whether theoretical models impacted behaviour in the programs, drawing conclusions about the determinants of health behaviours using models should be done with caution, as the models do not take into account all of the possible behavioural influencers (West, 2006). This concern is discussed in Williams et al. (2011). Based on TTM and SCT, some of the psychological constructs the researchers measured did not demonstrate the degree of change they were expecting compared to the control group, and suggested that with so many constructs targeted, it could be due to conceptual overlap.

Theoretical models have the potential to ground the entire study within a framework, with results analysed to determine if they support the theory and provide suggestions for improvement and growth of the theory (Michie & Abraham, 2004). Previous work from Rothman (2004) discusses the problem of studies making only a passing reference of the theory their interventions are supposed to be based on, rather than using the model to structure their entire study, including how the intervention tests the theory.

The studies with limited or no integration of the models used in the discussion were Romsas in Motion (Jenum et al., 2008; Jenum et al., 2006), 10

Keys to Healthy Ageing (Robare et al., 2011), and Walk Your Heart to Health (Schulz et al., 2015). Romsas in Motion, which was based on SOC and considered social-psychological and ecological perspectives, used psychological measures in their programs, but there was limited discussion of the results, and no conclusions made about how they may have impacted the study, and how this could contribute to future research (Jenum et al., 2008; Jenum et al., 2006). 10 Keys to Healthy Ageing (Robare et al., 2011) used SLT, however, there was no discussion about how this theory, or the goal setting used by participants contributed to the outcomes of the study, despite it being an integral part of the program's design. Schulz et al. (2015) did not use measures for the Social Ecological model or group dynamics theories they used and did not use the models to discuss their results. Given the importance of social support, which they have based their study on, discussion of how this related back to their results should have been included, informing their conclusions.

Other studies drew conclusions on elements of the models that they used in their programs, discussing how SE and social support impact PA outcomes, but they do not discuss the models themselves. Schoffman et al. (2015) using social support and SE measures, concluded that both factors were related to PA and outdoor recreational area usage. Becofsky et al. (2014) concluded that SE and social support mediate increases in PA in older adults through the use of the model in their program, and measures in data collection. For the HEAL program (Heatherington et al., 2015), while the TTM is acknowledged during the discussion of behaviour change, there is no discussion about the theoretical underpinnings of the behaviour change, and how this model could contribute to future research.

Plawecki et al. (2013) appears to be the best example of utilisation of the theoretical model throughout the entire program, as they have detailed how they used the models to inform the programs, assessed whether the health behaviours targeted by their models have changed, and drew their conclusions in relation to the models. Utilising the Health Belief Model (HBM) and Theory of Reasoned Action (TRA), Plawecki et al. found that the TRA helped to identify key attitudes, including PA and key attitudes that need to be addressed in future

programs, whereas the HBM demonstrated that participants recognised their susceptibility to osteoporosis. Plawecki et al. provides a good example of how to integrate theoretical models at each stage of program development and implementation. The SENIOR study (Clark et al., 2005; Greaney et al., 2008) was another example, integrating the results from the TTM into the conclusions and recommendations made.

The efficacy of theoretical models of behaviour to facilitate behaviour change further improves when they are used in all the stages of an intervention, from design through to conclusions made. When studies fail to discuss findings in the context of the theoretical models used, they limit the process by which theories can develop (Rothman, 2004). Utilising theoretical frameworks throughout the entire study bolsters the assumptions and conclusions made, assists researchers to identify the constructs responsible for outcomes, and lends to the improvement of future research based on the theory (Rothman, 2004).

Outcomes of theoretical models utilised by the studies.

There was no way to determine which theoretical model or construct was the most effective, given that they were all used in such different ways. SE, taken from TTM, was the most commonly discussed concept. It was positively correlated with positive changes in PA (Becofsky et al., 2014; Schoffman et al., 2015). Plawecki et al. (2013) saw an increase in dietary SE pre- to post-test, however, this was seen across both control and treatment groups. With SE increasing across both intervention and control groups, strategies specifically targeted at increasing SE should be utilised in future interventions.

In the SENIOR project (Clark et al., 2005; Greaney et al., 2008) and in Williams et al. (2011) there was no difference between intervention and control groups for SE outcomes, however both these studies found that participants doing more PA at baseline were more likely to complete the programs and have greater PA levels at completion. This would appear intuitive, given that these participants are most likely already in the action or maintenance stages of PA behaviours, and therefore may only have to maintain the behaviour, rather than initiate it. This result is important to note, because it demonstrates the difficulty

in getting inactive people to initiate PA behaviours. These programs are trying to increase average PA levels of inactive community members, but instead, appear to be attracting larger cohorts of people who are already active, rather than their inactive target group.

One of the reasons that the programs attract those already exercising could be that the programs do not address the barriers in place by those in the precontemplation and contemplation stages. A study by Lee (1993) examined the exercise behaviours of Australian females in different SOC. It was found that individuals in precontemplation did not have as much exercise knowledge or social support as those who were in the action or maintenance phases, and they did not expect psychological benefits or see it as an important health behaviour. Those in the contemplation stage felt they had more practical barriers to overcome when compared to those in the Action and Maintenance groups (Lee, 1993). Marcus, Selby, Niaura and Rossi (1992) looked at SE and SOC (using a four-point scale, with precontemplation, contemplation, action and maintenance) for exercise behaviours, and found that SE was significantly correlated with SOC, with those in the earlier two stages having significantly less SE than those in the later two stages. These findings, taken together, suggest that community-level programs need to find strategies to address their inactive target groups' lower SE levels in order to get them to initially engage in PA.

Social relationships, including support, integration, and negative interactions, have been shown to be important mediators of health behaviour change (Cohen, 2004). Social support, provided by group participation, was shown to be a significant mediator of PA across several of these studies in this review (Becofsky et al., 2014; Jenum et al, 2008; Jenum et al, 2006; Plawecki et al., 2013; Schoffman et al., 2015; Williams et al., 2011). A meta-analysis by Carron, Hausenblas and Mack (1996) assessed social influence (the pressure from others to modify behaviours, attitudes or beliefs) and exercise behaviours, including how social support is related to exercise. The researchers suggested that support provides positive reinforcement for the new exercise behaviour, and support from friends is a larger reinforcer than from family. Support for the behaviour makes engaging in the behaviour more appealing, and therefore, they

tend to also enjoy it more (Carron et al., 1996). Sumter County on the Move (Schoffman et al., 2015) recruited participants by recruiting group leaders who then had to go out and recruit friends to join. They found a significant effect for social support and outdoor recreational area use and PA. Given the links between social support and increase in PA, one way to address the recruitment of those in the precontemplation stage could be to recruit their more active friends and family first.

None of the studies reviewed conducted qualitative interviews that looked in-depth at the experience of participation in a community health initiative. Most of the information collected was through the use of quantitative questionnaires and some short-answer qualitative responses, which means that answers are given to pre-conceived ideas about what participation is like, and why people engage. It is through qualitative research that an exploration of the experience of participation can be conducted, and barriers and motivations for program participation can be revealed through new discussions. The current study aims to address this gap by conducting a convergent mixed methods study with a focus on a thematic analysis that explores the experience of participation in a community health initiative.

Limitations

As expected, the programs were all of such different designs, that to generalise conclusions about certain psychological models based on their results is not possible. The search only included programs from the past 20 years. Evaluating evidence from community-based programs is problematic in itself, as the people collecting the data are not always competent in accurate data collection practices, and there is also funding-body staff bias.

Only the papers found in the search were reviewed for inclusion, and therefore, it is possible that psychological constructs measured but not reported on in the papers may have been published in separate papers that have not been sourced for review, which may have influenced the results drawn. A risk of bias assessment was not conducted for the articles during the review.

Conclusions

While all of the studies stated that they utilised the theoretical models in the design of their programs, most did not explicitly state how the models were used in the intervention and assessment stages of their programs. It was not possible to determine if the programs were more successful if the programs were used throughout, or which model produced the better outcomes, due to the very different ways the models were integrated into the programs. The reporting of how theoretical models are utilised in the development, implementation and assessment of community-based health promotions should be improved so that future research can further improve the programs that are based on the models.

Chapter Four

Method

This thesis used both qualitative and quantitative methods to address the research question "What are the physiological and psychological factors and personal experiences associated with participation in the Wellbeing Tablelands Healthy Community Initiative programs?' A convergent mixed methods approach was used to answer this question.

The qualitative research questions were:

1. What are the participants' experiences of partaking in the Wellbeing Tablelands' programs?

2. How does participation impact their health behaviours?

3. What are the facilitators' perspectives of participation, and are they congruent with those of the participants' accounts?

The quantitative research hypotheses were:

1. The anthropometric measures of participants will improve through participation in the program
2. The physiological measures of participants will improve through participation in the program
3. The psychological measures of participants will improve from participation in the program

Participants

The participants of this study were taking part in one of two programs being run as a part of the Wellbeing Tablelands HCI on the Atherton Tablelands, Far North Queensland. It should be noted that neither of these programs were explicitly based on theoretical models of health behaviour, such as those outlined in Chapters 2 and 3. All participants of both programs were approached to take part in this study, which would have been approximately 50 people, and a total of 33 people agreed to take part in either the quantitative or qualitative part, or

both. Twenty-three female and ten male participants took part. They were aged 47-79 years, with an average age of 67 years.

Four participants were taking part in a one-hour water aerobics class held once a week for ten weeks in a heated public pool. This class catered for those primarily over the age of 75 years who had limited physical ability, and the exercises were gentle movements and stretches. These participants were approached in the fourth week of their program, and therefore were ineligible for the physiological and psychometric measures and took part only in the qualitative research. They were approached in the fourth week because the program was already running before the researcher was able to begin engaging participants.

The other 29 participants were taking part in a 12-week Beat It program, a one-hour water aerobics class held twice a week. Beat It was offered to those at risk of or currently dealing with Type II diabetes. This program had more strenuous aerobic activities than the previous program, the light water aerobics, and the aim of the program was to reduce the diabetes, chronic disease and obesity risk of participants. There was also basic nutritional information provided in a group setting at two sessions towards the beginning of the program. This program was run by an exercise physiologist, and all participants required a General Practitioner's (GPs) referral to participate.

All study participants were approached by the researcher and invited to participate. They were informed that if they participated in a qualitative interview, they would receive a $10 grocery voucher. Of the 33 participants, 25 took part in interviews for the qualitative aspect of the study, and 21 of the 33 participants consented to having their physiological measurements taken. Participants provided informed consent, as per James Cook University Human Research Ethics Committee requirements (Approval number H5468, Appendix A).

Table 2

Number of participants taking part in each component of the study

Study component	Number of participants	Gender	Program
Interviews	25	Female 18	Beat It 21
		Male 7	Water Aerobics 4
Physiological measurements	21	Female 12	Beat It 21
		Male 9	Water Aerobics 0

Quantitative Measures

Assessment 1 was conducted in weeks 1-4 of the program at the class location. Participants were given privacy to complete paper versions of the questionnaires, while having the researcher still present nearby to answer any questions. While it was not ideal to have some measures taken as late as week four, some participants had their first sessions in weeks 2-4 (therefore week 2, 3 or 4 was their first week), or it they had previously been at sessions, but it was not convenient for them to complete the questionnaires in the earlier weeks. This is a limitation of the study, as it means that some data points were measured after the program had started, which could have lessened the possible change seen from assessment 1 to 2.

Assessment 2 questionnaires were distributed at the cessation of the program. Some questionnaires were mailed out to participants with reply-paid envelopes, and others were completed in person during the final sessions.

Physiological measures.

Physiological outcomes related to physical ability included cardiovascular fitness, flexibility, muscle endurance (lower body, upper body trunk) and strength. Cardiovascular fitness was measured using a 6-minute walk test, flexibility by the sit-and-reach test, muscle endurance with sit-to-stand in one minute and one leg balance, and strength was measured/assessed with the 5-stage sit up test and seated medicine ball throw. Other physiological outcomes included resting heart rate (RHR), resting systolic (RSBP) and diastolic (RDBP) blood pressure. Anthropometric outcomes included weight, body mass index (BMI), and waist circumference (WC). Each of these anthropometric measurements were taken by qualified exercise physiologists during the first 1 to 2 weeks of the program (assessment 1) and again post-program (assessment 2), with the participants providing informed consent for this author to obtain the measurement results from the Beat It Program. Twenty-one of the total 29 participants taking part in the Beat It program had measurements provided to the researcher.

Data analysis for physiological and anthropometric measures.

Mean scores were calculated at assessment times 1 and 2 for the measures of weight, BMI, WC, RHR and blood pressure, and the difference between the assessment scores were reported. The mean scores were calculated for the participant cohort as a whole and split by gender. Scores were split by gender because men and women's bodies tend to lose weight, gain muscle and generally respond to exercise in different ways physiologically (Shephard, 2000). Wilcoxon Signed Ranks Tests were conducted to assess if there was a significant difference for the anthropometric measures. These were also conducted on the cohort as a whole and split by gender.

Physiological measures for physical ability were taken for assessments 1 and 2. These included sit-and-reach, sit-to-stand in one minute, right and left leg balance, six-minute walk, 5 stage sit-up and seated medicine ball throw. Mean scores were calculated for assessments 1 and 2 and split by gender. Wilcoxon Signed Ranks Tests were conducted for the scores split by gender and as a whole

to determine if there was any significant difference from assessment 1 to assessment 2.

Psychometric measures.

Four psychometric measures were used to assess SE, SD and individual SOC. These measures were selected to provide an overview of what motivated the participants, and their perceptions of their own exercise behaviour. SE was chosen to determine if the participants' belief that they were able to complete exercise when faced with various challenges increased from assessment 1 to 2. SD was measured to determine if increases in either autonomous or extrinsic motivation occurred, as an increase in autonomous motivation would suggest that as a result of the program, participants were more self-motivated to exercise. SOC was also measured to determine if as a result of the program, participants had integrated PA into their lives, rather than thinking about it or planning to.

SE was measured using a modified version of McAuley's (1992) Exercise Self-Efficacy Scale (Appendix B). The scale lists 13 barriers to exercise (for example, it's raining, they're experiencing pain, they're on holiday), and the participant selects on a scale of 0% (not at all confident) to 100% (highly confident) how confident they are that they could overcome the barrier to exercise. The scores are summed and divided by 13 to obtain an average exercise SE score. Previous tests demonstrate reliability (alpha coefficient =.92) (McAuley, Lox & Duncan, 1993), and validity, with exercise SE correlated with exercise participation (Lambda χ estimates >0.81) (Resnick & Jenkins, 2000).

SOC was measured using a five-point scale of the stages *precontemplation, contemplation, preparation, action* and *maintenance* (Appendix C). The stages refer to where the person is in regard to their exercise behaviour, from precontemplation, where they are not even considering doing exercise, to maintenance, were they have been exercising for more than six months. This scale is based on Prochaska and DiClemente's (1983) version for smoking cessation. The outcome obtained from the questionnaire is the single data point

of what stage is the participant at, at that point in time. Intertester reliability was found to be satisfactory at (.78) for this measure (Marcus, et al. 1992).

Two scales were used to measure SD: the exercise self-regulation scale (SRQ-E) (University of Rochester, 2013) (Appendix D) and the treatment self-regulation scale (TSRQ) (University of Rochester, 2013) (Appendix E). The TSRQ is concerned with to what degree an individual's motivation is autonomous for the performance of health behaviours. This makes it a suitable scale for evaluating motivation to participate in a health behaviour change program. The TSRQ has two subscales, they are autonomous regulation and controlled regulation. To score the TSRQ an average is found for the two subscales, and a Relative Autonomy Index (RAI) can be found by subtracting the controlled regulation average from the autonomous regulation average. Each subscale's internal consistency was acceptable, with most alpha values >0.73 (Levesque et al., 2007). Cronbach's alpha for the assessment 1 scale was .826 and assessment 2 was .840.

The SRQ-E uses four subscales to assess why people engage in physical activity, in terms of external, introjected, identified and intrinsic motivation. Scores are calculated from these four subscales, and a RAI can be calculated (University of Rochester, 2013). Assessment 1 Cronbach's alpha was .843, and assessment 2 it was .786.

Data analysis for psychometric measures.

Assessment 1 and 2 scores were analysed for SE, the two SD scales and their subscales, and SOC, and the differences in scores calculated. Wilcoxon Signed Ranks Tests were conducted to assess if there were any significant improvements for SE, SOC, and SD scales and subscales. Kruskal-Wallis tests were conducted to test if the participant's SOC had a significant impact on the difference in scores for SE and the SD subscale and RAI scores.

Qualitative Interviews

Participant interviews.

The original design was to interview participants separately, in an attempt to lessen the chance of socially desirable answers or social pressure to conform. Some participants refused to be interviewed separately, for reasons including that they were too shy, but they said they would participate in a group interview. Group interviews were arranged so these individuals could participate. The table below illustrates the numbers in each group. The term 'cohort' refers to the two different locations Beat It was conducted.

Table 3

Participant interview numbers and locations

	Beat It Cohort 1	**Beat It Cohort 2**	**Water aerobics**
Interviewed alone	7	1	4
Group interview	6	7	0
Cohort total	13	8	4

During the initial session, participants were invited to be interviewed, and they were reminded by the facilitators at each session to participate if they would like to. Each potential participant was provided with an Information Sheet and those who chose to partake signed Informed Consent Forms. Twenty-five participants were interviewed; four from the water aerobics and 21 from the Beat It program. The four water aerobics participants were interviewed separately at their convenience between week three to five of their program. One participant was interviewed in a quiet area at the swimming pool after the class had finished, and the other three interviews took place at the nursing home where the individuals lived. The 21 Beat It participants who completed interviews were interviewed between week two to twelve, either before or after the class, when they were available. For cohort 1, participants were interviewed in a quiet space at the public pool where the program took place, and for cohort

2, the interviews took place in a private space adjacent to their pool in their gated complex. The interviews lasted between ten and forty minutes, and were voice recorded.

The semi-structured interviews included questions designed by this author and a researcher who had been working on the Wellbeing Tablelands evaluations during the months prior. The questions evolved through personal reflections and discussions about observations made during this work. Interviews were conducted in a casual conversation style, so that questions may have been asked out of order, to ensure flow of the participants' discussion, however all topics were covered. These questions included:

- Have you heard of Wellbeing Tablelands?
- What current exercise do you do, and what did you do before this program?
- What has stopped you from being able to exercise?
- Why do you continue to engage in this program?
- What are your thoughts and opinions about the facilitators?
- Do you plan to continue exercising after the program has finished?
- How have your behaviours, either exercise or eating, changed as a result of this program?

Data analysis of participant interviews.

Qualitative data was analysed using Braun and Clarke's (2006) Thematic Analysis (TA). This analysis is inductive, assessing semantic themes from a realist perspective. Braun and Clarke (2006) outline a six-step process for conducting TA in psychology, which has been utilised here. A summary of the process is as follows:

Step 1. *"Familiarising yourself with the data"* (Braun & Clarke, 2006, p.87)

Interviews were transcribed by the researcher, usually within the days following the interview, in order to become familiar with the data and identify initial topics and patterns. Interviews were transcribed verbatim, including noting pauses and filler "ums" and "ahs". As this author conducted the interviews, they were able to include what had happened during these pauses, such as "participant performs swimming action here". This ensured a comprehensive account of the interview. All interviews were read in full before proceeding to the next step.

Step 2. *"Generating initial codes"* (Braun & Clarke, 2006, p.88)

As this was an inductive study assessing semantic themes, the entire data corpus was coded, with codes stemming from what was present in the data rather than searching for specific topics. All data items were given equal attention, with as many codes generated as needed. Some data items were coded under more than one code. Coding was completed by hand on printed transcripts of all interviews.

Step 3. *"Searching for themes"* (Braun & Clarke, 2006, p. 89).

The codes generated are sorted into overarching sub-themes and themes. This section involved writing each code onto post-it notes and organising and re-arranging them on a board, until they were grouped together in initial candidate themes.

Step 4. *"Reviewing themes"* (Braun & Clarke, 2006, p. 91).

Initial candidate themes have been identified, therefore next they are assessed for *internal homogeneity* and *external heterogeneity.* The researcher went through the themes and the codes under them to ensure that the data items within a theme "cohere together meaningfully" (Braun & Clarke, 2006, p.91), while the themes overall are distinct from one another. This involved moving some codes between themes to see where they fit and consolidating sub-themes. All data items were collated in their coded groups, put into their themes, and read together to ensure that the items fit together to demonstrate an overarching issue. Those that did not fit topic-wise were removed, but

contradictory viewpoints of a code were kept, as the idea is to highlight and account for these contradictory viewpoints.

A thematic map was created from these themes, to assess if they were an accurate representation of the data. Finally, the data corpus was re-read and further coded for any items that were missed in the first sets of coding, and themes were reviewed again. It was at this point that nothing substantial was being gained from re-coding the data corpus, so coding ceased at this point. Data was entered into NVivo at this point, with the hand-written codes entered into the program.

Step 5. *"Defining and naming themes"* (Braun & Clarke, 2006, p. 92).

Each of the themes were defined using a few sentences to ensure that the understanding of what each theme represented was clear, and that the themes were not too large. It was during this step that several subthemes were created under key themes, to keep each theme succinct. The names of the themes were either phrases taken straight from the data or developed from key words in the data of the theme.

Step 6. "*Producing the report*" (Braun & Clarke, 2006, p. 93).

This final step involved writing up the themes, telling the stories of the participant's experiences, and using quotes from their data to help illustrate points. Rather than provide a simple description of the themes present, the idea was to provide a compelling story about what the data suggests, using examples from the data to support the arguments. Notes, memos and summaries were consistently written throughout the data collection and analysis process, as an important part of the qualitative research process, and these provided the foundations for some of the writing.

Facilitator interviews.

Semi-structured interviews with the facilitators were conducted to explore whether facilitator's perceptions of why participants engaged in the program matched those of the participants, and if they understood the barriers, enablers and motivators of the participants to engage in general health

behaviours. Four facilitators were interviewed, two were Wellbeing Tablelands council staff who were facilitating the HCI as a whole, and two were individual program facilitators. Facilitators were approached by the author within the initial week of Beat It to partake in the interviews. One Wellbeing Tablelands interview was conducted in a quiet space at the public pool, and one was conducted via phone. The two program facilitators were interviewed separately in a quiet space at the public pool. The interviews lasted between ten and thirty minutes. Similarly, to the participant interviews, questions were devised by the author and a fellow researcher who had been working on the Wellbeing Tablelands evaluations. Because the interviews were looking for opinions, the interview was more structured than those of the participants, with the aim to obtain certain information. Questions for the interview included:

1. What is your background/qualifications in health/health education?
2. Why do you believe participants engage in the program?
3. What do you believe stops people from being able to exercise in their own time? (Topics should cover cost, accessibility, issues specific to the location, health)
4. What do you believe motivates people to exercise in their own time?
5. Do you believe people's health behaviours will change as a result of participating in the program?

Other topics of interest were discussed as they came up.

Data analysis for facilitator interviews.

Unlike the participant's inductive analysis, analysis of facilitators' interviews was deductive, whereby pre-decided codes were developed to code the data with in order to address the research questions. The research questions were developed after the interviews had taken place, but before analysis had taken place, where the decision was made to compare and contrast their

opinions with those of the participants, using codes taken from the participant's data set (as well as highlighting any relevant codes), rather than create an entirely new analysis in a stand-alone manner. The primary research question for the facilitators was, "What are the facilitators' perceptions of participation, and are they congruent with those of the participants' accounts?' Research questions devised to assist in answering this primary question through analysis included:

1. Why did the participants join and continue in the program? Do facilitators recognise the motivators the participants listed?
2. What barriers are there to engaging in health behaviours on the Tablelands, and do facilitators recognise those the participants listed?
3. What enablers are there for engaging in health behaviours on the Tablelands, and do facilitators recognise those the participants listed?
4. Do the facilitators believe that participants will sustain the health behaviour changes learnt in the program?
5. Do facilitators understand what benefits the participants feel they themselves get from attending, or do they have a different idea about what benefits the participants should have?

The data was analysed using the same steps as outlined in the participant section, with the only difference being that it was a deductive analysis using pre-determined codes, in addition to highlighting new relevant codes.

Chapter Five

Quantitative Results

Introduction

This chapter presents the quantitative results for the SE, TSRQ, SRQ-E and SOC scales, as well as physiological and anthropometric measures. Participants were taking part in community-level health programs in Atherton and Mareeba on the Atherton Tablelands as a part of a government-funded initiative.

Screening of the data

All data was screened prior to analysis to assess if it met assumptions for parametric tests. For the psychometric scales, SOC data violated the Kolmogorov-Smirnov test of normality, as did several of the TSRQ subscales (Auto at time 1 and 2 and RAI time 1). For the anthropometric data, six of the 13 measurements violated the Kolmogorov-Smirnov tests. Several of the anthropometric variables also had outliers. Given these violations and small sample sizes, nonparametric tests were conducted.

Anthropometric and physiological measures

Participant anthropometric and physiological measurements can be seen in Table 4. Wilcoxon Signed Ranks Tests were conducted to evaluate any changes in these measures from assessment 1 to 2. The scores were assessed both separated by gender and together because research has shown that gender can impact the effects of PA on physiology (Shephard, 2000). As seen in the results, there was a significant reduction in waist circumference (WC), with no significant results for the other anthropometric and physiological measurements.

Table 4

Anthropometric and physiological measurements (Mean ± SD), at assessment 1 and assessment 2

		Assessment 1	Assessment 2	Difference
Weight	Females	76.77 ± 12.68	76.46 ± 3.54	-0.31
	Men	94.16 ± 18.31	94.29 ± 7.53	+0.13
BMI	Females	29.73 ± 3.68	29.58± 3.93	-0.15
	Males	31.49 ± 6.08	31.53± 6.58	+0.04
Waist circumference (cm)	Females	96.21 ± 10.49	94.50 ± 11.47	-1.71
	Men	110.43 ± 16.35	108.57± 16.12	-1.86
Resting heart rate (BPM)	Females	82.00 ± 13.23	76.14 ± 11.18	-5.86
	Men	72.00 ± 11.25	70.29 ± 12.42	-1.71
Resting Blood pressure	Females	Systolic: 120 Diastolic: 76	126 74	+6 -2
	Men	Systolic: 121 Diastolic: 73	116 68	-5 -5

Table 5

Participant anthropometric measures Wilcoxon Signed Ranks Test scores

		Weight	BMI	Waist circumference	Resting heart rate	Systolic resting	Diastolic resting
Females	*Z*	-.778[a]	-.663[a]	-2.037[a]	-1.858[a]	-1.780[b]	-.440[a]
	p	.437	.507	.042*	.063	.075	.660
Men	*Z*	-1.807[a]	-1.997[a]	-2.232[a]	-.762[a]	-1.357[a]	-1.153[a]
	p	.071	.046*	.026*	.446	.175	.249
All participants	*Z*	-1.637[a]	-1.554[a]	-2.995[a]	-1.775[a]	-.237[b]	-1.450[a]
	p	.102	.120	.003*	.076	.813	.147

a. Based on positive ranks.

b. Based on negative ranks.

* $p < .05$, therefore result is significant

Reductions in WC were significant for both genders. Male participants decreased their WC by an average of 1.86cm (Z = -2.232, p =.026), whereas the females decreased their WC by an average 1.71cm (Z = -2.037, p = .042). Male participants also saw a significant decrease in their BMI (Z = -1.997, p = .046).

The remaining anthropometric results were non-significant, however, there were three measures which were close to reaching significance. There was a decrease in weight for males (Z = -1.807, p = .071) however, the average weight remained steady with only a 0.13kg increase on average. The females decreased in RHR (Z = -1.858, p = .063), but there was an increase in RSBP (Z = -1.780, p = .075). These scores are reflected in a decrease of 5.86 BPM, from 82bpm to 76.14 bpm, and an average 6-point increase for RSBP from 120mm/Hg to 126mm/Hg. Overall, average scores for all the anthropometric measures decreased, other than the males' weight and BMI.

Physiological measurements for physical ability

Wilcoxon Signed Ranks Tests were conducted for each of the measurements, with the results shown in Table 6. The tests were completed with genders separated as well as combined to determine if there was a difference for the genders separately as well as a cohort overall. As demonstrated in the table, the hypothesis that there would be significant improvements for physiological measurements of physical ability was supported for sit-and-reach, sit-to-stand, and seated medicine ball throw.

Table 6

Results for physiological measures for physical ability (Mean ± SD)

		Assessment 1	Assessment 2	Difference
Sit-and-reach (cm)	Females	-4.57 ± 6.61	1.43 ± 5.68	+6
	Men	-12 ± 17.43	-3.29 ± 8.67	+8.71
Sit-to-stand in 1 minute	Females	25.00 ± 11.62	28.71 ±9.93	+3.71
	Men	24.86 ± 9.21	30.42 ± 6.45	+5.56
Right leg balance (sec)	Females	16.36 ± 20.12	21.92 ± 22.02	+5.56
	Men	40 ± 19.15	36.00 ± 23.60	-4
Left leg balance (sec)	Females	27.93 ± 25.03	27.36 ± 22.03	-0.57
	Men	28.29 ± 24.18	34.43 ± 18.75	+6.14
6-minute walk (m)	Females	503.79 ± 168.48	553.21 ± 140.52	+49.42
	Men	614.29 ± 144.26	579.29 ± 89. 51	-35
5 Stage sit up (Stage)	Females	1.32 ± .93	1.23 ± .41	-0.09
	Men	1.33 ± 1.08	1.83 ± .68	+0.50
Seated medicine ball throw (m)	Females	2.79 ± .44	2.96 ± .56	+0.17
	Men	3.20 ± .35	3.61 ± .43	+0.41

Table 7

Wilcoxon Signed Ranks Test for physiological items

		Sit-and-reach	Sit-to-stand	Right leg balance	Left leg balance	6-minute walk	5 stage sit up	Seated medicine ball throw
Females	Z	*-3.048a*	-2.812a	-1.571a	-.535a	-1.603a	-1.378b	-1.511a
	p	*.002**	.005*	.116	.593	.109	.168	.131
Men	Z	*-1.527a*	-1.572a	-1.069b	-.736a	-.338b	-1.604a	-2.032a
	p	*.127*	.116	.285	.462	.735	.109	.042*
All participants	Z	*-3.270a*	-2.903a	-1.225a	-.750a	-.971a	-.359b	-2.507a
	p	*.001**	.004*	.220	.453	.331	.719	.012*

a. Based on negative ranks

b. Based on positive ranks

* p< .05, therefore a significant result

The physical ability scores did show significant improvements for three measures, with participants split by gender in the Wilcoxon Signed Ranks tests. Female participants showed an improvement in the sit-and-reach (Z = -3.048, p = .002), with their average flexibility improving by 5.9cm, from -4.47cm to 1.43cm. The Z score for the males was not significant for the sit-and-reach, (Z = -1.527, p = .127), but their average reach improved by 8.71cm, from -12 cm to -3.29cm.

Female participants also significantly improved in the sit-to-stand measure (Z = -2.812, p = .005), with an average increase in lower body muscle endurance of 3.71 sit-to-stands per minute, from 25 to 28.71. Male participants also had a greater average improvement, with an average increase of 5.56 sit-to-stands per minute, going from 24.86 to 30.42, however this improvement was not reflected in the Z score of the Wilcoxon Signed Ranks test (Z = -1.572, p =

.116). The scores for the two measures sit-and-reach and sit-to-stand are significant when genders are combined, with a greater change and greater level of significance, (Z = -3.270, p = .001) and (Z = -2.903, p = .004) respectively.

For seated medicine ball throw, there was a significant improvement for the males (Z = -2.032, p = .042), with their upper body muscle endurance score improving by .41m, from 3.2m to 3.61m. The Z score for the genders combined is also significant (Z = -2.507, p = .012), with the females' score improving on average by .17m, from 2.79m to 2.96m. While none of the other tests were significant, the females improved in cardiovascular fitness with an increase in walking 503.79m to 553.21m in six minutes, an improvement of 49.42m, or 9.8% increase on their assessment 1 scores. The males' distance decreased an average of 35m, down to 579.29m.

Psychometric measures

Four psychometric tests were used to assess the individuals' SE, SOC, and SD scores. These constructs are discussed in more depth in Chapter 2, Theoretical models of health behaviour. They have been used in this thesis to determine if there were any significant changes to participant health behaviours as a result of program participation. SOC was assessed at assessment 1 and assessment 2 using a five-point scale. At assessment 1 57% of the participants were already at Stage 5, and none at Stage 1, therefore it was not expected to see a large shift in a progression of stages. The hypothesis that there would be a significant increase in stages from assessment 1 to assessment 2 was not supported, using a Wilcoxon Signed Ranks test, Z= -.555 (based on negative ranks), p=.248.

Table 8

Stages of Change, at assessment 1 and assessment 2

Stage	Assessment 1, N= 28	Assessment 2 N= 15
1. Precontemplation- I currently do not exercise and do not intend to	0	0
2. Contemplation- I currently do not exercise, but am thinking to start	1 **(3.6%)**	0
3. Preparation- I currently exercise some, but not regularly	5 **(17.9%)**	2 **(13.3%)**
4. Action- I exercise regularly and have begun in the last six months	6 **(21.4%)**	2 **(13.3%)**
5. Maintenance- I exercise regularly and have been doing so longer than six months	16 **(57.1%)**	11 **(73.3%)**

SE was measured using a 13-item SE scale, and SD was measured using the SRQ-E and TSRQ. Kruskal-Wallis tests were conducted to determine if there was a difference in SE or the two SD Relative Autonomy Index (RAI) scores depending on the participants' SOC assessment 1 and assessment 2. As demonstrated in the tables, no significant results were found, suggesting that SOC was not related to scores on the SE and SD scores. The hypothesis that SOC would be related to scores on SE and SD was not supported.

Table 9

Self-efficacy scores by Stage of Change (Mean Rank)

Stages of Change	Assessment 1	Assessment 2
Pre-contemplation	.	.
Contemplation	16.00	.
Preparation	13.10	3.00
Action	14.00	6.50
Maintenance	15.03	8.00
H	.267	2.736
df	3	2
p	.966	.255

Table 10

Self-determination Treatment sub scale and total scores by Stage of Change (Mean Rank)

Autonomous regulation sub scale	Stages of Change	Assessment 1	Assessment 2
	Pre-contemplation	.	.
	Contemplation	.	.
	Preparation	19.00	9.50
	Action	18.33	8.75
	Maintenance	12.60	4.88
	H	5.069	3.606
	df	3	2
	p	.167	.165
Controlled regulation sub scale	Pre-contemplation	.	.
	Contemplation	19.00	.
	Preparation	13.50	3.00
	Action	15.50	4.50
	Maintenance	9.93	6.75
	H	3.899	1.644
	df	3	2
	p	.273	.440
Overall Treatment RAI score	Pre-contemplation	.	.
	Contemplation	11.50	.
	Preparation	18.67	10.00
	Action	9.50	8.00
	Maintenance	11.50	5.00
	H	3.681	2.909

df	3	2
p	.298	.234

Table 11

Self-determination Exercise sub-scale and total scores by Stage of Change (Mean Rank)

External regulation sub scale	Stages of Change	Assessment 1	Assessment 2
	Pre-contemplation	.	.
	Contemplation	22.50	.
	Preparation	11.50	7.00
	Action	11.58	6.50
	Maintenance	14.03	7.11
	H	2.532	.048
	df	3	2
	p	.470	.976
Introjected regulation sub scale	Pre-contemplation	.	.
	Contemplation	6.50	.
	Preparation	9.00	5.00
	Action	13.33	2.50
	Maintenance	14.84	8.44
	H	2.414	4.460
	df	3	2
	p	.491	.108
Identified regulation sub scale	Pre-contemplation	.	.
	Contemplation	14.50	.
	Preparation	7.50	6.25
	Action	12.00	6.75
	Maintenance	15.13	7.22
	H	2.839	.119

	df	3	2
	p	.417	.942
Intrinsic regulation sub scale	Pre-contemplation	.	.
	Contemplation	7.50	.
	Preparation	7.67	5.50
	Action	12.67	9.50
	Maintenance	15.28	6.78
	H	3.322	1.176
	df	3	2
	p	.345	.555
Overall Exercise RAI	Pre-contemplation	.	.
	Contemplation	9.00	.
	Preparation	10.67	7.50
	Action	15.33	9.50
	Maintenance	13.63	6.33
	H	1.109	1.121
	df	3	2
	p	.775	.571

Wilcoxon Signed Ranks Tests were conducted to evaluate changes from assessment 1 to 2 for the scale and subscale totals for SD and SE measures used. There was one significant result found, for the TSRQ subscale autonomous regulation, (Z = -2.003, p = .045), suggesting an increase in autonomous regulation. The hypothesis that scores for SE and SD would increase from assessment 1 to assessment 2 was therefore not supported for all but one sub scale, autonomous regulation.

Table 12

Significance of changes on psychometric questionnaire scales

		Z	*p*
	Self-efficacy total	-.874[a]	.382
TSRQ autonomous regulation subscale		-2.003[a]	.045*
TSRQ controlled regulation subscale		-.204[b]	.838
	Treatment total	-1.691[a]	.091
SRQ-E external regulation subscale		.000[c]	1.000
SRQ-E introjected regulation subscale		-.535[a]	.592
SRQ-E identified regulation subscale		-1.696[a]	.090
SRQ-E intrinsic regulation subscale		-1.584[a]	.113
	Exercise total	-.707[a]	.480

a. Based on negative ranks

b. Based on positive ranks

c. The sum of negative ranks equals the sum of positive ranks

* p< .05, therefore a significant result

A Wilcoxon Signed Ranks Test was conducted for the SE questionnaire, and it was found that there was no significant difference from assessment 1 to 2 for the final score on the test (Z = -.874, p = .382). While participant numbers for the SE measure were low, particularly at assessment 2, descriptive statistics were run for the individual items on the questionnaire (Table 13). This was to compare the assessment 1 and 2 scores for each item to the reasons given for not exercising in the qualitative data. As seen in the table, at assessment 1 "I didn't like the particular activity program I was involved in" was the lowest scoring item at 28.57%, followed by "I felt pain or discomfort when exercising" at 31.79%. "I felt pain or discomfort when exercising" was one of only two items to

decrease from assessment 1 to 2, with a decrease of 5.64%, and was the lowest-scoring item at assessment 2. “My schedule conflicted with my exercise session” decreased 2.22%. This lower score indicates that the individuals feel less confident they would be able to overcome the barrier at assessment 2 compared to assessment 1, where they started.

“The weather was very bad” was the highest scoring item at both assessment 1 and assessment 2 with the scores being 64.29% and 68.46%, respectively. The item that saw the biggest increase was “I had to exercise alone”, going from 48.93% to 67.69%, a change of 18.76%. The second largest improvement was for “An instructor does not offer any encouragement”, with 14.26%, while “I felt self-conscious about my appearance when I exercised” was the third largest improvement with a 10.44% increase. These increases in scores from assessment 1 to 2 indicate that after participating in the program the participants have greater confidence that they would be able to overcome these particular barriers.

Table 13

Self-efficacy questionnaire individual items (Mean % ± SD)

I believe I could still exercise if: (0-100%)	Assessment 1 N= 27	Assessment 2 N= 13	Difference
The weather was very bad (hot, humid, rainy, cold)	64.29 ± 29.11	68.46 ± 26.09	+4.17
I was bored by the program or activity	46.07 ± 39.28	50.00 ± 35.36	+3.93
I was on vacation	41.79 ± 33.99	45.83 ± 32.88	+4.04
I was not interested in the activity	43.21 ± 39.63	50.77 ± 34.27	+7.56
I felt pain or discomfort when exercising	31.79 ± 29.19	26.15 ± 18.95	-5.64
I had to exercise alone	48.93 ± 36.55	67.69 ± 35.36	+18.76
It was not fun or enjoyable	36.43 ± 34.56	46.15 ± 37.54	+9.72
It became difficult to get to the exercise location	33.57 ± 30.58	36.15 ± 37.76	+2.58
I didn't like the particular activity program that I was involved in	28.57 ± 31.23	38.46 ± 32.62	+9.89
My schedule conflicted with my exercise session	46.07 ± 34.36	43.85 ± 34.29	-2.22
I felt self-conscious about my appearance when I exercised	55.71 ± 36.86	66.15 ± 38.85	+10.44
An instructor does not offer me any encouragement	50.36 ± 37.96	64.62 ± 38.21	+14.26
I was under personal stress of some kind	48.93 ± 37.05	51.54 ± 31.05	+2.61
FINAL SCORE	44.29 ± 23.69	50.55 ± 22.15	+6.26

For the psychometric tests, there was one significant result for an increase in autonomous regulation on the TSRQ, indicating that autonomous

regulation to attend the program (the 'treatment') increased. There were also significant improvements for males' BMI, and all participants' WC, sit-and-reach, sit-to-stand and seated medicine ball throw. While there were insignificant results in the other measures, a number of these results still improved from assessment 1 to 2.

Summary

The reduction in WC was significant for both genders, and there was a non-significant improvement for all other anthropometric scores, except for male BMI. The three physiological measures of females' sit-and-reach, females' one-minute sit-to-stand test, and the seated medicine ball throw for the males also had significant improvements.

Chapter Six

Methodology: Researcher Standpoint

Introduction

This section relates primarily to the qualitative aspect of the study. The researcher standpoint introduces the reader to the researcher, detailing previous life experience that is relevant to the study, such as previous work as a research assistant on the HCI, and previous experience of weight, health and eating experiences. It 'brackets' where I sit experientially in relation to what I am researching and highlights possible personal biases. Finally, the research paradigm is discussed, including ontological and epistemological frameworks, and justification of the type of analysis used for the qualitative aspect of the study.

Researcher Standpoint

The researcher standpoint explains my personal experiences of the topics under study: Wellbeing Tablelands, obesity and engaging in health behaviours. The aim is to demonstrate that my awareness of my personal experiences may bracket my interpretation of events, and what biases I need to keep in mind. It explains how my experience as a participant in the programs could be different to those of my study participants due to the demographical differences between us.

Previous work on Wellbeing Tablelands.

The participants of the study lived on the Atherton Tablelands, approximately one-hour drive through the ranges west of Cairns. I grew up in Cairns and had several extended family members living in different towns and cattle stations across the Tablelands, so I knew the area well when I began as a research assistant on the evaluation of Wellbeing Tablelands in the six months leading up to the commencement of my Research Masters degree. During my time as a research assistant I engaged with the community at events doing health promotion. This included handing out health promotion pamphlets and free cut vegetables at shows, and also conducting research, such as short quantitative

questionnaires about health behaviour engagement. Through discussions with the public, I came to learn that most had the right idea about what health behaviours they should be engaging in, however there were many reasons why they did not engage in these behaviours. These included lack of time, lack of access to facilities, cost of food, as well as lifelong habits. It was through this engagement and wondering what the community members actually felt about the effectiveness of these programs in changing their health behaviours, that the general premise for my Research Masters began to form.

Personal Standpoint.

I participated in the programs at the invitation of the facilitators at the beginning of the programs. This was a free offer, and there was no expectation of them receiving money in return for my participation. It was understood that at the end of the program I would not be engaging further with the participants. I did not know any of the participants beforehand, however, I quickly became acquainted with most when I joined their classes twice a week.

I was 27 years old and the youngest participant, with the majority of participants over 50 years. I am slim and petite, and participants would joke, "why are you here, you don't need it". I did not tell them that I was an obese child, and after having "grown into" some of the weight, I was overweight until I was 13. Just before turning 14, I uncontrollably lost 15 kilograms (66kg down to 51kg) and went from overweight to underweight in 4 weeks, through complications of undiagnosed Coeliac Disease.

When a diagnosis came at age 24, I was in the recommended weight range, but struggled with hypoglycaemia from the sudden increase in high-GI, high-sugar gluten-free food. I was diagnosed by a doctor with "Thin Outside, Fat Inside" high visceral fat, and I was classified obese, despite a BMI of 21.05. It was recommended that I lose weight, something I have not achieved in the five years since, partly due to struggling to make consistent healthy food choices. Many of my food choices are influenced by those I live with. I am unwilling to eat a completely different diet, as food is such an important part of spending time with loved ones.

I know what it is like to be judged because of my weight, and I have experienced attempting to change my healthy food and exercise behaviours. I know how strong the influence of those around you can be, and that it is not as simple as "just eating better". I have been teased about my "tasteless cardboard" gluten-free food, and I have even been verbally abused for refusing to eat sugary treats (which were turned down due to gluten), being accused of thinking I was "too good" to eat sugar. These experiences have taught me to never underestimate just how powerful peer pressure is to engage in the social practice of sharing treats that are often sugar-filled and/or not healthy choices.

I recognise that while I have not had much success through actively implementing better health behaviours, this is not the case for everyone. I understand that being young, I do not have the life experience that my participants have. During the program I was exercising approximately eight hours per week, doing Irish dancing and roller derby. I did not do these activities 'to exercise', but rather to be social and have fun, and exercise just happened to be a part of it. I recognise that my motivations and expectations of exercise were different to what the program's desired outcomes were for the participants. I acknowledge that because I am slim, I fit the ideal of 'attractive' according to mainstream culture, and there are privileges associated with this that some of my participants will not have. Despite the rate of overweight and obesity in Australia being 63%, (AIHW, 2016) there is still considerable stigma, misunderstanding and blame associated with the condition. Being aware of these factors and personal biases should limit the influence they have on my coding of the data.

My participation in the programs.

I engaged in the classes in the same way the other participants did, doing the same activities alongside them. I was given equipment to work with, worked in pairs with others, and followed all instructions. I also noticed my body changing and improving, just like the other participants had. My upper body strength improved, and my back pain stopped. Sometimes I was invited into conversation by program participants, and listened to them 'off-the-record'

about what they thought of what activities we were doing that day, careful to not ask any leading questions or questions I would likely ask in interviews, but rather letting them lead the conversation. They would candidly joke and discuss their thoughts with me, as well as those around them, generating conversation between themselves about the program that I could listen to. I was able to observe their conversations with the facilitators, as well as their behaviours during the classes, to get a general idea about attitude towards the class and the exercise, and actual engagement. This provided me with a yardstick to be able to assess the trustworthiness of the responses that participants provided me during the interviews.

The Research Paradigm for Participant Interviews

This research was designed to provide a representative description of the personal experience of participating in a community health initiative, including motivations, barriers and enablers to physical activity. It is experiential qualitative research, which "validates the meanings, views, perspectives, experiences and/or practices expressed in the data." (Braun & Clarke, 2013, p. 20). Experiential research seeks to understand the participant's point of view and experience, with the data coding and analysis focused at the semantic level. It is assumed that people are able to provide straightforward and accurate verbal descriptions of their realities.

The ontological paradigm of this study is *realism*, and the data is analysed through the epistemological lens of a *postpositivist* paradigm. These positions were chosen because this study sought to provide an explanation of personal experience. Realism asserts that there is one true reality, and this can be known through observation and correspondence (Braun & Clarke, 2013). Realism suggests that the verbal accounts the participants provide of their experiences are representative of reality. The postpositivist paradigm suggests that there is a *truth* that can be known through research, but the context will influence the researcher's work, as will their theoretical knowledge (Braun & Clarke, 2013). Postpositivism enabled the descriptions of experience provided in the interviews to be accepted as truth, while acknowledging that myself, the researcher, would

have interpreted these descriptions through my own contextual and theoretical lens.

Levels of Analysis.

Thematic analysis allows the researcher to make decisions about how the data will be coded at several levels. This study is an inductive study, assessing semantic themes from a realist perspective (Braun & Clarke, 2013). Being an inductive study, all data is assessed and coded, and the themes are then constructed from the bottom-up, through analysis of all the codes. The data coding and analysis was approached without any preconceived ideas about what issues or topics the themes should represent. This approach was selected because examining the experience of participation in a community health initiative is a new area of research. With no previous ideas or theories proposed, the aim of the study was to ascertain a broad understanding of the experience from the perspective of the participant. As the study is from a realist perspective, assessing semantic themes, it asserts that individuals are capable of accurately voicing their own experiences, and the analysis considers only the words that they have spoken, and takes them at face value, rather than searching for underlying themes or socially constructed ideas (Braun & Clarke, 2013).

Strengths, limitations and opportunities of methodology.

Thematic analysis allows for the data to be analysed without the need for preconceived theoretical frameworks that might influence the conclusions made (Braun & Clarke, 2013). The interviews encouraged participants to discuss their experiences of the HCI, allowing for rich discussion unhindered by preconceived ideas, rather than them selecting limited items on a quantitative measure. Interviewing also allows the researcher to control where the conversation goes and ask unplanned questions. The limitations of interviews for thematic analysis are the risk that participants may feel more pressure to provide socially acceptable answers, given the social interaction aspect and sensitive nature of the topic (Braun & Clarke, 2013).

Chapter Seven

Participant Qualitative Results

The thematic analysis found five themes for the personal experience of participation in a community health initiative, as seen below with their corresponding sub themes.

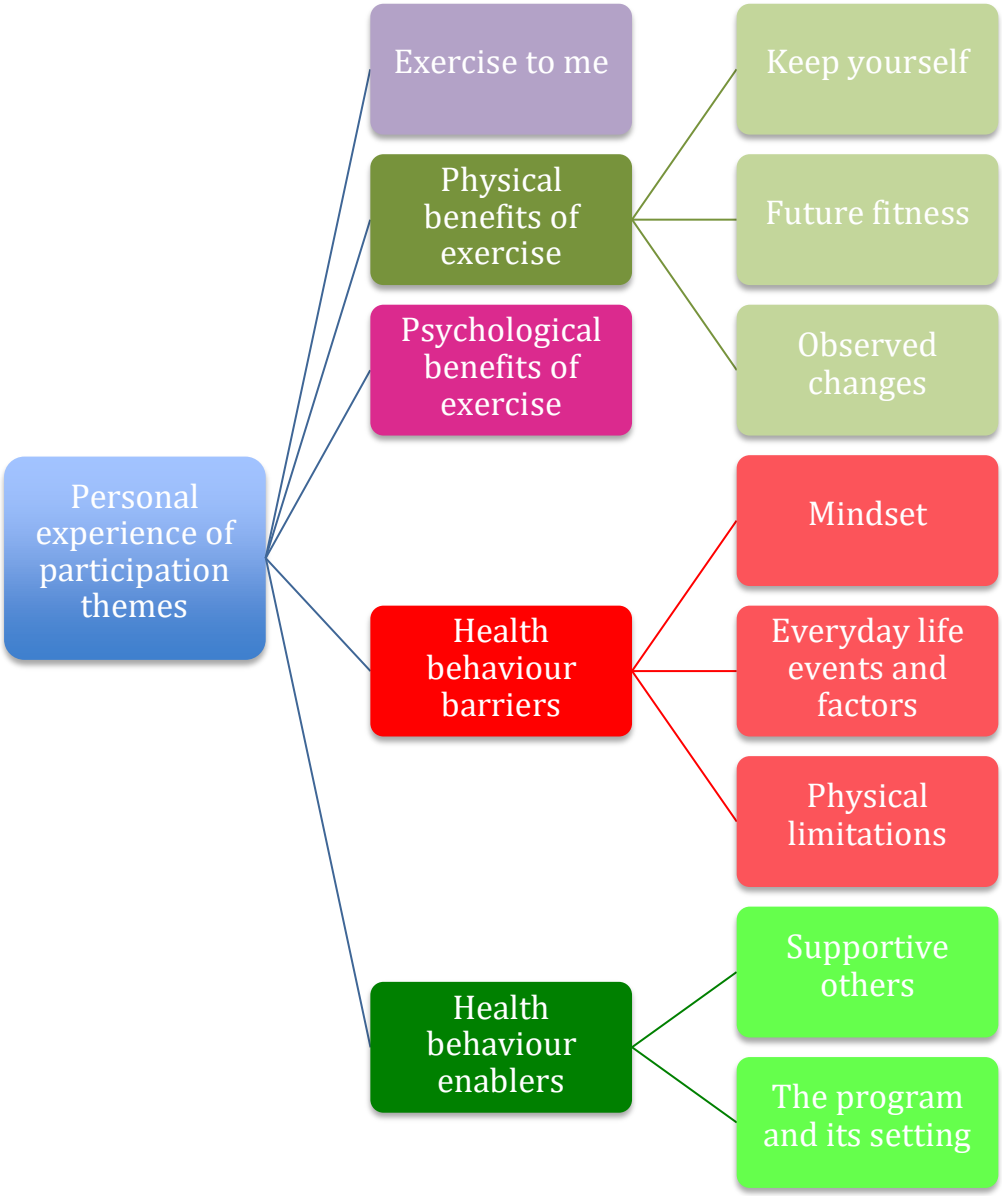

Figure 2. Themes and corresponding subthemes.

Notes on interpreting the participant interview data

Given the sensitive nature of discussions about health behaviours, socially desirable answers were a risk (Braun & Clarke, 2013). The researcher enquired about current behaviours rather than goals or ideas of ideal behaviour to mitigate this risk. Participants did not appear to provide socially desirable answers, and they were open to detailing their PA habits that were below that of recommended levels, as well as detailing their diet that they knew was not ideal. Their answers also corresponded to what was observed by the researcher during program participation, and to 'off-the-record' conversations prior to or following interviews. There also was no apparent difference between the codes and themes seen in the interviews compared to the group interviews, indicating the different settings did not impact responses provided.

For the purposes of this chapter, the terms PA and exercise are used interchangeably, as this is how participants used them. Participants were asked specifically 'What *exercise* do you perform?' Unaware of the academic differences in definitions, they proceeded to outline activity they personally considered to be exercise. There was great variability about what participants considered to be exercise, and their ideas reflected their current physical capability and what degree of PA it took for them to feel exhaustion. This is explored in the theme 'Exercise to me'. For this study, the personal considerations of completing PA, and the psychological and physiological experience of doing so, is of more importance and interest to the researcher than the physical demands of the activity itself.

Discussions with the participants found that many were not aware that the programs were funded at the national level, and the aims of the Australian Government's Healthy Community Initiatives (Department of Health, 2012) did not factor in their decisions to partake. They were more concerned with health and wellbeing issues at their personal and immediate social levels.

The personal experience of participation in a community-level health initiative

Exercise to me.

Twenty-one participants were doing some kind of traditional exercise outside of the program, either at the time or in the previous twelve months, including walking, gym and weights, swimming, dancing and Tai Chi. One participant who claimed to feel unmotivated to exercise went on a 2.6-kilometre difficult terrain walk the day before.

Each individual had a different relationship with exercise and personal definitions of exercise reflected their ability. There were different ideas about what constituted exercise and how much exercise should be completed. For those with impaired physical ability, whether due to injury, restricted range of movement, or an aged body, simple household tasks were considered exercise. For others, generally with greater fitness levels, any activity that left them feeling *'tired'* or having muscle soreness was exercise. This exercise was usually '*traditional*' exercise, this being planned exercise performed for the sake of exercising.

Due to the physical limitations of some individuals, simple routine chores that got participants moving and challenged their mobility were considered exercise:

> I have to get up from here and walk right down to the end of the nursing home, lunch time and tea time at night, that is a reasonable amount of walking. And then after tea at night I have to walk to the dining room to pick up a meal and walk back again to my room, so I actually get a lot more walking, I haven't stopped all together. It's not as if I just come back and sit in my room in between meals. And I'm always happy to rush down to the laundry for something. So I feel that I am getting in enough walking.

Even though walking several hundred meters per day would not be adequate to meet the Australian recommendations for exercise (Department of Health, 2014) the participant felt it was enough for them. For a female participant, doing laundry was considered exercise:

> I'm active at home because I, we, live with family, and my job is to do the laundry, and there is six, eight, sometimes ten of us there. And that's my thing, and I can handle that, because I can do that in my own time… I'm

> much slower at moving around so things take me longer… That's good, the lifting... It works, it's working for me.

Gardening was another everyday activity that was identified as exercise by three participants, in particular, mowing large rural properties.

Two participants stated that there was a difference between daily labour and exercise. Each considered PA from during a daily chore different to exercise that was beneficial to health, which required cardio or interval training:

> I don't know anybody who does a really hard job… I've done a lot of hard work, manual work, and although I was fit, I was never super fit. Work never got me fit, I needed somewhere where you had interval training, where you really pushed yourself, back off, push yourself, back off.

The personal definition of exercise was not defined by the type of exercise participants had done throughout their lives, but rather by what they were capable of doing at present. Therefore, the participant who feels he is capable of intense interval workouts incorporates that into his definition of exercise. The participant who felt that walking several hundred meters around their living complex was exercise, had made '*hundreds of thousands'* of beds as a nurse over 56 years, and danced with her friends. The participant who felt laundry was exercise had played badminton and walked everywhere, before a back injury stopped her. Their current physical limits provided them with a new personalised meaning of exercise.

Physical benefits of exercise.

The Physical benefits of exercise has three sub-themes; 'keep yourself', 'future fitness', and 'observed changes'.

Keep Yourself. The sub theme 'keep yourself' focuses on the maintenance and management of one's physical body and ability, and the term was taken from the first participant quote below. It centres around three key issues: ability maintenance, health threat management, and weight management. These issues are inter-related, as health threats could be managed through maintaining current physical ability (Warburton et al., 2006).

Most participants were more interested in maintaining their current lifestyles, rather than greatly improving their fitness or reducing weight. The issue of ability maintenance highlights how exercise facilitates the maintenance of mobility, flexibility, fitness, and general health. Participants engaged in exercise *'for fitness'*, to *'keep us active'*, and *'general well-being'*. This belief was seen more so in those who saw themselves as generally 'older' and had resigned to having an aged body:

> I think there comes a certain time, when you get older, when you don't want all that cardio stuff, unless you have been doing it all your life… what you want is to be able to keep yourself flexible, keep your balance going, and just sort of keep your muscles toned up.

One participant felt she had to keep fit so she would have the ability to maintain her property, after her husband passed away several years ago.

Health threat management refers to how exercise can impact the individual's specific health concerns. These include managing health-related threats, improving health, and avoiding health problems. One participant was concerned that they were unable to walk any distance because of breathing issues, and they felt exercise assisted in managing this threat: *'I thought, I've gotta do something to keep (going), and that way I can do it (walk) without putting any new stress on my breathing.'* The water supported their weight at aerobics, making breathing easier, and the flexible program ensured they could exercise at their own pace. Another participant had endured a heart attack within the past year and wanted to improve his chances of health. After carefully researching medical recommendations, he concluded that the exercise the program offered would benefit his health and recovery timeline.

Participants discussed family histories of issues such as heart disease and osteoporosis, with exercise considered to be a way of avoiding these conditions for as long as possible. One woman felt that exercise would not manage all health threats, as it had not helped her mother avoid three heart attacks. However, she continued to exercise to try and avoid heart disease. One

participant did Tai Chi for balance, to avoid troubles associated with a lack of balance and an ageing body, *'you've only got to fall over and you can do a femur.'*

The threat of diabetes was a motivator for three participants. Some were trying to control the onset or progression of their diabetes, while others were simply managing the disease:

> I've been borderline diabetic (recently)… (I have) carried a lot of weight in my tummy area and my GP explained that that's the worst for diabetes, as well as my liver, to carry that weight, and if I started this program, which was available at the time, just to see how I performed… For my control of diabetes, if I can get it down to a certain level, everyone's happy, my doctor doesn't, you know, have to keep on to me, but the main part was actually to just to try and get the right exercises so that I can conduct them at home to be able to… actually get rid of it (visceral fat). If I can get rid of that, then it will start to go off my liver as well, and makes for a healthier body.

For this particular individual, exercising was important for their weight loss efforts and diabetes avoidance, and they succeeded in losing their excess weight.

The issue of weight was of varied importance for different reasons amongst participants. Only some participants were motivated to either maintain their current weight or lose weight. While the one-to-two hours of water aerobics per week may not have been realistically enough to lose any amount of weight (Department of Health, 2014), some participants felt that it might work. One elderly participant commented, *'I've always considered any kind of exercise could help a little. I know it's not strenuous enough to use up too many calories, is it really?'* This demonstrated she felt that while the program may not result in a personally significant amount of weight loss, it could help. A comparatively younger participant returned to the program after putting on weight over the Christmas break. Gaining weight made her feel '*bad*', but she felt that the program had previously given her the kick start she needed to get exercising and lose the weight: '*I have done this before… I went back to the doctor and got*

another referral to come back to the program again… coz over Christmas I put on a lot of weight.'

All participants in the program appeared to be accepting of all bodies and abilities. From observation, there were no derogatory comments made of other participants' physical abilities or bodies. There was comparison of oneself against others, and this comment was made not in a derogatory tone, but rather as a reflection of one's own motivations: '*The other thing is, I don't wanna sound rude, I see the people here, they are a lot bigger than me, and I am thinking there is no way in the world I'm gonna get like that.'* This individual felt that program participation would help them to avoid weight gain.

Future fitness. Future fitness concerns specific future-focused exercise goals, including lifelong goals. This male participant felt exercise was going to be important for the rest of his life:

> I've always been pretty fit, you know, I've just had 2 bad years, or (a bad 18 months) [sic], I'm nearly back to where I was. They said I will probably be the healthiest corpse in the bloody cemetery. Well… this is my personal opinion, but I would rather be nice and fit now, and just drop dead, one day in the middle of an exercise, going up the pool, or lifting weights, or in the middle of the desert, doesn't matter, but doing something. Not drooling and being in a bed and just sitting there, you know. I can put off having strokes and heart attacks, any more heart attacks, I'm saving myself a lot of grief and I am saving the government a lot of money.

One participant had chronic fatigue syndrome, so exercise needed to be efficient to make the most of his limited energy. He joined the program to learn energy-efficient exercises to continue after the program ended. He also had great success with his goal to lose weight during the program and planned to continue monitoring his weight. One couple planned to keep exercising after the program finished because they were going on a walking holiday several months later, and felt they needed to 'get going' so they would be fit for it. Exercise tasks that are future-focused are tailored to abilities, motivations, and goals.

Observed changes. Observed changes include noticeable improvements to fitness or mobility. As no-one was interviewed before the program, it is unknown if expectations of changes were motivators for commencing the program, but it encouraged them to continue in it: *'I am getting fitter. I am noticing I am getting fitter, and that's my motivation.'*

> In the pool too, you feel, when we first started, you'd get to the end of the pool and say "oh, I got there". Now you can go up and back, up and back about 6 or 8 times, it doesn't worry you anymore.

Some participants noted they were able to perform movements they previously could not, due to either injury or restricted range of movement:

> (At the program) I could use the over arm stroke in the pool which I hadn't done for about twenty years… I had done gym exercises, trying to loosen that up, and whatever needed doing, and it didn't work, and without even trying, within four weeks here I found I could do it, so I was pretty impressed with that.

The swimming had enabled them to overcome these previous restrictions.

An improvement in muscle tone was reported by seven participants. Five participants noted they had lost weight, from only a couple of kilos, up to over twenty kilos, and one specifically noted they had not lost any, but had put on muscle and lowered cholesterol. Other changes include one participant noticing an improvement in balance from practicing tai chi, another finding an improvement in exercise self-confidence, and one participant felt they were now converted from gym to pool exercises.

The psychological benefits of exercise.

Program attendance provided psychological benefits, including socialising, the opportunity to physically challenge oneself, and a sense of achievement. Without any prompting from the interviewer, at least one participant in each solo or group interview would say they enjoyed socialising during the program, and in the interview groups all participants agreed. It was

the only theme code that was represented in every interview, demonstrating that socialising was a key benefit for all participants in the programs.

There were two distinct ideas about socialising from the data. For some, socialising was an advantage of attendance, it made the hour go faster, and added some fun to the experience: *'You can socialise, ya know, with everybody here, which is really great': 'It doesn't feel like exercise, because you're laughing as well, ya know?'* Another participant noted *'I think for a lot of the people who are on their own, it's an opportunity for them to come out and be with other people.'*

For others, programs were seen as an opportunity to socialise, or get out of the house, and this was their primary motivation for attending: '*It's very good for socialising… because, there is very little I can do these days, that I don't have any family much except for one niece here, I don't have any old friends or anything.'* One participant was dealing daily with his wife's declining health and said *'I [sic] like anything that take my mind (off his current situation) …I will do something if you take me out'* (English second language). For one couple, the program was a chance for *'me time'*. Family commitments took up a lot of their time, and the program made life easier to cope with in general because of the *'us time'.*

On a personal level, some compared their effort and progress to that of other participants, as well as to their understanding of their own ability. Any noticed changes in physical ability were positive reinforcement for their efforts. Some enjoyed that they could work and challenge themselves at their own level, which was lower than the ability of those around them, but still be included; '*I enjoy the lower impact one, and sometimes I'll challenge myself. That's why I go down to the deep end or I cycle without the noodle. Coz I know I can do that, but it just keeps me challenged.'*

Simply completing the session provided positive psychological feedback for some. When asked why they attended the program, the participant replied, *'because I feel we are achieving something… it helps a bit with pain… and feeling better about myself.'* Another participant had found that losing some of her physical ability had been hard psychologically, so being able to actively participate in exercise had made her feel better:

> Up until I had this fall, yes, I was [sic] always been active and enjoyed it, I liked being active, so it's been a real set back to me emotionally and mentally, since I couldn't move around freely on my own. But since I've been doing the program I find I look forward to coming. I can't do as well as everybody else does, but because I'm in a group that all have certain problems, it doesn't matter.

Health behaviour barriers.

Each individual was exercising in the program, and therefore their discussion of barriers refers more so to self-initiated exercise outside of the program. The three subtheme barriers are 'mindset', 'life circumstances', and 'physical limitations'.

Mindset. Mindset demonstrates how an individual's mindset influences health behaviours. The main factors were lack of motivation and enjoyment, excuses, and conflicting advice.

Five participants said they lacked *'motivation'*, another claimed '*I'm lazy'*, and two others said there was no one to '*prod*' them. For some who lacked motivation to exercise on their own, the scheduling of the programs' sessions encouraged attendance. One individual lacked SE for walking: '*I just can't do the distance, and have given (walking) up now, because it was starting to stress me out'.* Perception of ability was a factor in deciding what exercise program to do: '*I didn't want to go into something where I was going to fail at it.'*

Enjoyment of the activity, whether it be enjoying cardio rather than weights, or smaller class sizes, or being in the water in general, factored in deciding to participate for some. One participant claimed she did not like any exercise at all, exclaiming, '*I'd rather sit down and read my book, thank-you!'* This participant had gone on a social walk the previous day, demonstrating that their concept of exercise affects their understanding of how much they are performing. There was a difference of opinion amongst some participants about how much exercise should be performed. Some felt that one to two hours of

exercise at the program per week was enough, whereas others felt they should be doing a lot more.

Excuses for avoiding exercise were provided in order to reduce cognitive dissonance for some participants who identified they were not doing enough exercise:

> I really do need to keep (exercising), because there is… heart disease in the family. I need to keep an eye on that, and I try and keep moving, although it didn't seem to do much for mum in the end…. She played indoor bowls, she played outdoor bowls, she played golf. And ah, she had three heart attacks, and she ate a good diet.

A general distrust of some generic health recommendations was also discussed, with one participant pointing out, *'… they tell you don't eat salt, then the next thing, salt is okay, then they say don't eat the butter, try margarine, then they say the canola in the margarine is no good for you, so you think, god damn it, I'm just going to live'.* While these may not necessarily be government regulations, with health recommendations coming from many different sources, the general distrust pervades the perception of all recommendations.

Everyday life events and factors. Incorporating health behaviours was challenging for some, as even when time and effort was allocated, other priorities arose. Healthy eating and exercise behaviour were interrupted by family events, social celebrations, and appointments that required travel to access services.

> I put on a little bit of weight, it depends on what is happening in my life, you know? There's my husband's birthday, and that was a big weekend. Um, so you tend to eat more… than you normally do, when you've got family there… Every first Friday of the month we have this barbeque , and you tend to get all in the mood of it and have a few drinks more than you normally should.

Family responsibilities, also took priority over scheduled exercise for this couple: '*We used to go walking, for a long time we would get up and go walking every morning, and I think just family things overtook us.*'

Finally, weather and location were two environmental factors relevant to most participants. Program sessions were held in regional towns, and some individuals had to travel over 20 kilometres to attend, while some had to rely on others for transport. One participant who lived just a few minutes' drive outside the township said they were not motivated to come into town to exercise on their own, it was the program that motivated them to come in. Participants felt that exercise had to be suitable for the different seasons, as the area has hot summers with high UV, and cold winter days. For general exercise, individuals felt there were good walking tracks available around the regional area, and exercise facilities available, but they had to be comfortable in the weather, and they had to travel a distance to use them. Cost, in terms of fuel and entry to facilities, was a barrier, with some on tight pensions or supporting family.

Physical limitations. Some of the participants had unique physical limitations, including illness, physical ability, and swimming ability. The individuals discussed how they worked around their issues in order to benefit from exercise at the program and modified the exercises when they needed to.

Chronic illness and pain interfered with the participants' ability to exercise, from conditions which were somewhat manageable, such as ulcerative colitis and chronic fatigue, to everyday tasks being interrupted due to issues such as osteoporosis, arthritis, bone problems, or cardiovascular conditions. Some had to consider the impact their condition had, such as this example:

> I actually have ulcerative colitis. So, in the past, before this, when I was walking, because I am not someone who generally moderates myself, so I started off doing one lake walk, really enjoyed it and thought, okay, rather than work into that, I decided to walk a lake a day, and that put me back into being ill, and back on heavier drugs and things for a long time, so it has taken me probably about two years to recover from that. So, I'm very mindful about going with how I feel, and going with exercise, and if I feel

> it's not going to benefit me on that day then I give it a miss and go the next time.

Another appeared to play their condition down, feeling that as long as they took it into consideration, they would be okay:

> I'm not really sick at all, I'm never sick, but I have had to slow up, and the intolerance of exercise is because it affects my breathing. To the extent that it will trigger an angina attack if I get too breathless.

Some participants had issues with temporary injuries that caused pain and limited mobility in the back or knees. Others found the cold weather and the cold pool water caused muscle cramps. With the majority of participants aged over 55, some felt that aging and the general decline in fitness that comes with it had impacted their ability to exercise.

Health behaviour enablers.

The participants discussed the factors in their lives that enabled them to exercise. In the theme 'exercise enablers' there are two subthemes, 'Supportive others, and 'The program and its setting'.

Supportive others. Program attendance required time, transport, and sometimes the support and assistance of GPs and family. The larger program was free for those with a GP's recommendation. Some saw the program advertised and approached their GPs, and others heard about the program from their GPs. According to one participant, a local GPs surgery was promoting another of the programs running, which was appreciated: '*we've got the doctors on our side... One of the surgeries has actually referred people, so that's good'.*

Participation would have been either harder or impossible for some if they did not have the support of family. One male participant with chronic fatigue had a finite amount of energy, and to participate he had to rely on his wife to maintain the household. He felt the changes to his body from participating positively impacted his health. Several of the participants brought their partners along for support, and the partners joined in the exercise. Finally, some participants detailed how their families provided support in other ways, such as

transport, or accommodating physical requirements around the house, such as placing the washing line under the house so the individual could carry on their physical household chores.

The program and its setting. The program itself was an exercise enabler, and conducting the program in a pool attracted participants for particular reasons. Two females simply enjoyed being in water. The most common attraction of the water was the mobility and ability the individual gained when their body weight was supported; '*The pool is less stressful on your body, you can work at a harder pace'; 'My knee is always playing up, but you don't feel it in the pool'.* One participant did not have the ability to swim laps, but found they were able to complete the stationary moves in their slow-paced class. The equipment used in both programs was also a help, in particular, the 'pool noodle': *'I think the noodles are a great asset, you know, you feel a bit tight and the noodle keeps you going. And there are so many exercises you can do with the noodle, with different parts of your body'.*

The facilitators also brought their own value to the program. One participant had been speaking to the facilitator about exercises they were performing outside of the program, and found that they were not optimum for maintaining their physical ability at their age with their condition. On the whole, participants felt that the facilitators were approachable and encouraging, and helped make exercising a positive experience.

Lastly, the program appealed to some participants simply because it was convenient. For the participants in one town, the program was offered within their living complex, a primary factor in their decision and/or ability to partake. When asked what previous barriers were to exercise, for example cost, transport, or interest in the activity, one participant replied that they simply had not looked at anything else because it was not convenient, although they do report later in the interview that they were *'sucked in'* by the fact it was free. The residents of the complex had access to two pools and a gym on the grounds, therefore, simply having convenient access was not enough to enable regular exercise for everyone.

Facilitator Qualitative Results

Overview.

- Four facilitators were interviewed: two independent facilitators contracted to run the program examined here, and two facilitators from the council team overseeing the HCI
- The HCI team member interviews were conducted at the end of the program, and the two independent facilitator interviews were conducted approximately eight weeks post-program, and they had set up their own private classes to replace the HCI program
- A deductive thematic analysis was conducted to evaluate the opinions and expectations of facilitators compared to their participants. Their views were considered important because they can directly influence the experience of the participant, and the study wanted to determine if they defined the enablers, challenges, motivators and enjoyment experienced by the participants in the same way the participants do.

Understanding of barriers.

All facilitators agreed cost was the most problematic barrier for joining organised PA, recognising that most participants were over 60 years of age, on a limited income. They live in a low socioeconomic area, with low employment, and according to one facilitator, *'they'd sooner spend the money on bad things that make them feel better, such as the booze and the cigarettes… it's just a vicious cycle for them'.*

Facilitators noted that without the government-funding subsidy for the program, several of the participants would not have been able to join in the first place. They evidenced this claim by reporting that while the program had continued on beyond the HCI, about half the dedicated HCI participants could not return due to the independently-run sessions costing $8 per session.

> I don't think we can underestimate the impact that cost of participation would have on our target group… People that are in a financial position where perhaps they are relying on a pension or very limited income, it's quite a significant investment… when you've got a choice between eating and participating in a program… eating would be more important.

Access to transport was also mentioned, as there is no public transport service in the area, so the facilitators were aware if the participants did not have their own mode of transport, they could not make it to the venue.

Facilitators felt that some participants had a sound knowledge of physical health and it was an enabler for them, whereas other participants did not have enough knowledge, which created a barrier to undertaking health behaviours. A facilitator said that one of their participants had personally felt that they met their health goals for diabetes-related complications, so they went back to their old unhealthy habits, not understanding the actual seriousness of their disease. One facilitator suggested that these '*were the sort of people that you couldn't change'.* Low income could also affect health choices, and facilitators felt there was a lack of knowledge about affordable, healthy options.

> Not a lot of people work, and they are the people you really need to aim at, 'cause they're sitting at home buying all this junk food 'cause that's all they think they can afford to do, instead of looking at healthier options.

Facilitators said that programs across the HCI had target groups to encourage people at different fitness levels, ages and abilities to participate. They felt that this particular water program was great for their target group of senior citizens on low income at risk of chronic disease complications, because people with less physical ability could do the exercises, unlike some of the other gym- and field-based programs. One facilitator did note, however, that because it is a one-size-fits-all approach, that it simply cannot cater to absolutely every individual, try as they might.

Some participants did have to drop out due to illness or life events, but the facilitators felt that their given reasons were valid. There were also several who never commenced the program even though they were eligible because they

could not commit to the entirety of the program. Timing can be an issue for some, as the programs were held in late morning on a weekday, but one of the facilitators felt the timing of the overall program was okay, as it did not run over Christmas or in the middle of winter. Overall, the barriers that facilitators identified were cost, access to transport, lack of health knowledge and education, and to a lesser extent, physical ability and life events.

Program elements as enablers.

Given the rural location, only a limited amount of activities have been available to residents in the past, but one facilitator felt that the HCI introducing several new PA activities in the area in recent years had helped them to compete with '*the diversity… there might be in a city setting*'. The presence of the HCI itself was an enabler for people to access organised PA. One facilitator noted that several of their participants attended more than one program because several of the programs were targeted to their personal circumstances, and the different programs had made quite a difference for several people. One participant had lost over 20kg after attending both a healthy eating and an exercise program.

The two HCI team facilitators felt that the facilitators of all the different individual programs across the HCI were enablers themselves (and in some cases with programs other than the one studied here, a barrier). They felt the program studied here was one of the most successful programs conducted, due largely in part to the facilitators.

With high cost being a barrier to PA, the free or gold coin donation sessions available were an enabler to entice new participants:

> That's where Wellbeing Tablelands has been really successful, we have been able to offer programs… which has given people the opportunity to try out some different programs, and make the most of them… It's great that once they went, they're a captive audience in many respects, but in order to get them there in the first place, the fact that it was a free program, that really was the reason why they were all keen to come.

As the program studied was conducted in a pool, it catered to many levels of fitness and ability:

> A lot of people who didn't think they could ever get into an exercise class or do any other constructive type of exercise now can. It's non-weight bearing, so for those people with injuries, back problems, knee-joint replacements, hip replacements, it's the ideal exercise environment.

Participants could challenge themselves to a level they felt comfortable with, and one participant was able to completely modify all exercises to suit the shallow end of their pool, where they were more confident despite their decreased mobility.

The program facilitators had approximately ten of their original program participants continuing the water aerobics program some three months after the program had finished. This was under a private arrangement due to demand. The program was also generating interest through word-of-mouth referrals in the community, with new comers joining the program. The aerobics facilitators felt the increased interest was due to the program being easy to engage in.

One facilitator suggested that participants may like that there are people at the programs whom '*look like they look in some respects*', in terms of physical appearance and ability. It was a safe space where they could put in *'effort with people who were experiencing similar [physical and health] things to them… the classes also provided a safe, supervised environment for those with chronic conditions'.* This facilitator suggested that going to the sessions was intrinsically rewarding for participants because of the physical benefits.

> Most of them are improving, and the majority of it…. just love it, and they feel so much better after exercising than if they don't. And even sometimes, if you feel a bit sluggish, and you don't want to exercise, when they've done the class, they're more energised, and they just feel happier, and have more energy to just do the activities of daily living.

Other enablers the facilitators mentioned included the weather, families bringing other members, and the cooperation of the pool management.

Health advocate enablers.

Participant recruitment included a leading Australian diabetes association inviting people in the locale with diabetes to participate in the program. Facilitators suggested that only *'four to six'* people joined that way as most could not commit to the program times. General practitioners were enablers for some participants, as they referred them to the program, supplied health records and generally encouraged their patients to participate in the program. Many of the participants were already seeing an exercise physiologist before the program had begun and were referred through them.

Social enablers.

As seen in the participants' results, socialising was also identified as a key enabler by facilitators.

> It's nicer in a group, 'cause you get, you know, the camaraderie and everything, and we have these morning teas, it's good, 'cause some of them… won't (be) getting out and meeting anybody, and so it gives (them) a bit of social time as well, it's good.

The facilitators felt that the programs enabled participants to socialise with people they would not normally have the opportunity to meet. New friendships, social and health opportunities then open up to them.

Overall impressions.

According to the facilitators, the program included in this research was one of the most successful programs over the course of HCI. This was evident in the participation and retention rates, and ongoing participation after the official HCI program ceased.

> This program has been incredibly successful, great participation rates, excellent results in terms of the health benefits that have been attained… so it is something that has worked very well for our region.

The facilitators had their own personal hopes for the outcomes of the programs, which focused on an educated population that would continue to make better choices long after the initiative ended; an *'educated population when it comes to health… a lot of people just don't have any idea about what to do, or what they should be doing, what an optimal exercise level would be for their situation… (it) all comes down to education'.*

> I think it will make quite a difference, especially in Indigenous communities with eating… we'll see people months later and they'll say, I'm still eating right, I'm not having KFC for dinner every night. And just teaching them that health food can be affordable, you don't have to be making gourmet meals.

Some of the benefits mentioned included significant weight loss, increase in energy levels, a feeling of well-being, and, the most popular reason given amongst participants and facilitators alike, socialising.: '*The participants got a lot from it, both physically and mentally, so it would be a shame (if) the cost of that program was out of their reach, that they could not continue'.*

Another facilitator said that overall *'they look happier, they are healthier, they are fitter. They will extend their life, I mean, you can't put figures on these types of things… they've got more flexibility, they've got more movement, they're more agile than ever before'.*

Finally, the discussion between the researcher and one facilitator ended with this exchange, which from the researcher's perspective encompasses what the overall impression was of Wellbeing Tablelands:

> It's a fairly diverse group of people, and you know, it isn't always easy to feel like you are a part of a community, so it was lovely to see people coming together from all different backgrounds, all different walks of life, but they had a common goal, a common interest, and they really, they support each other, and they genuinely want to share each other's success.

Chapter Eight

Discussion

This thesis examined the health behaviours associated with participation in the Wellbeing Tablelands HCI programs. The thesis aimed to answer the research question: 'What are the physiological and psychological factors and personal experiences associated with participation in the Wellbeing Tablelands Healthy Communities Initiative programs?' A convergent mixed method approach was used to answer this question. The physiological and psychological characteristics of the participants were measured quantitatively while the experiences of the participants and facilitators were explored qualitatively. The findings are combined in a convergent mixed methods design to present an overall picture of the experience of participation in an HCI, including physiological and psychological changes.

Anthropometric and physiological characteristics

The duration of the light water aerobics class was 10 weeks, while Beat It was 12 weeks, and participant measurements were taken at assessment 1 and 2. It was hypothesised that there would be an improvement in participant anthropometric measures. Reductions in WC were significant for both genders, with males losing an average of 1.86cm, and females 1.71cm. WC has been shown to be a better predictor than BMI for diabetes, coronary heart disease and mortality (Klein et al., 2007), as well as obesity-related health risks in adults, when a continuous scale is used (Janssen, Katzmarzyk and Ross, 2004). Obesity-related health risks include hypertension, unhealthy cholesterol markers, and metabolic syndrome (Janssen et al., 2004). It is recommended that program participants try to continue to decrease their WC, as a WC equal to or greater than 88cm in females and 102cm in males increases the risk in co-morbid conditions (Lean & Morrison, 1995). For the anthropometric measures in the current study the significant decrease in WC was a positive result for the participants.

It was also hypothesised that there would be an improvement in physiological measures following the intervention. While the results were non-

significant for both genders, female participants did experience a decrease in RHR to 76 bpm. The men's assessment 2 average RHR was 70 bpm. Higher risk of mortality, along with decreased life expectancy, are two issues associated with elevated RHR, even in healthy individuals. For men, there is a 5- to 6-fold increase in the risk of sudden cardiac arrest when the RHR is 88-99 bpm compared to 60-65 bpm, while for females it is a 2-fold increase, and the lower it decreases, the lower the risk (Reil & Bohm, 2007). A lowering of RHR is therefore important to heart health.

Female participants saw a nonsignificant rise in RSBP from 120 to 126 mmHg. According to the Heart Foundation Australia (2018) a systolic reading of 126 mmHg can still be considered in the normal-to-high range. The male participants' RSBP decreased from 121 mmHg to 116 mmHg. According to Lionakis, Mendrinos, Sanidas, Favatas and Georgopoulou (2012), the risks of hypertension of 130/80 mmHg or greater in the elderly include threats to heart and kidney health, stroke and dementia. It is therefore positive that neither gender on average had stage 1 hypertension of higher than 130/80mmHg.

Overall, in terms of mean scores, with the exception of the male participants' weight and BMI, all anthropometric and physiological scores improved, even if not all significantly. The programs helped participants get closer to meeting the Australian PA guidelines, which suggest undertaking a minimum of 150 minutes of moderate, or 75 minutes of vigorous, exercise over a week, including two strength sessions (Department of Health, 2017a). The sessions in the current programs used weights and endurance tasks to serve as strengthening exercises. The WHO Global recommendations for PA for individuals 65 years and older stress the importance of PA to lower the risk of heart disease, stroke, diabetes, colon and breast cancer, and promote cardiorespiratory fitness and muscle strength, and a healthier body composition. PA also helps to maintain physical ability, lowers the risk of falls, and aids in cognitive function (WHO, 2011). The American College of Sports Medicine's (ACSM) publication "Exercise and Physical Activity for Older Adults" stresses that exercise is important at all ages, and even if one cannot meet the recommended amount, they should strive to get as close as they can, as any

exercise is better than none. The ACSM suggest this is because the benefits of exercise can lower the risk of chronic diseases, including Type 2 diabetes (Chodzko-Zajko et al., 2009). It is therefore recommended that participants work towards achieving the required amount of exercise to minimise this risk.

An individual's muscular strength and endurance contributes to their overall health, ability to carry out day-to-day activities that require movement, and is a predictor of mortality (Myers, Prakash, Froelicher, Partington & Atwood, 2002). For this study, there was significant improvement for three physiological measures, including the females' sit-and-reach, the females' one-minute sit-to-stand test, and the seated medicine ball throw for the males.

The sit-and-reach test measures the flexibility of the lower back and hamstring muscles, which can assist in reducing the incidence of lower back pain (Chodzko-Zajko et al., 2009). The male participants increased their reach by 8.71cm, although this was not significant. However, the female participants significantly improved their flexibility by 5.9cm. The improvement in flexibility is reflected in the qualitative results where participants described how they noticed their flexibility had improved. In terms of upper limb flexibility, they could conduct movements requiring flexibility that they could not do pre-program, such as lifting their arms above their shoulders. The ACSM recommend that older adults undertake flexibility training two days per week as it is suggested it can help with fall prevention, injury and back pain (Chodzko-Zajko, et al., 2009).

The seated medicine ball throw measures upper body power of older adults (Harris et al., 2011). Upper body power is required to complete daily tasks, such as carrying laundry or groceries, or even pushing oneself up out of a chair. Reduced muscle power production is associated with mortality, while muscle power preservation can help individuals maintain physical functionality (Evans, 2000). There was a significant improvement for the men's seated ball throw score, and the combined gender score was also significant, where both genders saw an improvement in distance thrown. This suggests that participants

have gained some muscle power, which will contribute towards the benefits of physical functionality (Evans, 2000).

The one-minute sit-to-stand test is used to determine lower-body muscular endurance. According to a study by Strassmann and colleagues (2013) females aged 65-69 years in the 50th percentile can perform on average 33 sit-to-stands in one minute, while males in the 50th percentile can average 35. As the average age of the participants in this study was 67 years for both genders, the females' final score of 28.71 is closer to the 25th percentile. While the females had a significant improvement in their test, both genders need to improve in this area. Having greater lower body endurance can prevent or delay physical frailty (Guralnik, Ferrucci, Simonsick, Salive & Wallace, 1995), and can affect gait, balance and physical ability to complete tasks such as climbing stairs (Brown, Sinacore & Host, 1995). When lower body strength decreases the risk of falls and hip fractures can increase, which in turn can lead to disability and dependence (Lord, McLean & Stathers, 1992).

For the six-minute walking test, females increased their walking distance from 503.79m to 553.21m, an improvement of 49.42m, or 9.8% increase on their assessment 1 scores; however, this was found to be not significant. The men's distance decreased an average of 35m, down to 579.29m. Improving cardiovascular fitness is important in older populations because it lowers risk of heart disease, which is the leading cause of death in Australia, as well as stroke and high BP (Nichols, Peterson, Alston & Allender, 2014). The results for the females, with the increase in distance walked, plus significant improvements in sit-and-reach, and sit-to-stand, suggest that the females may have had an overall improvement in fitness and stamina.

While most of the results were not significant, there were improvements for most of the scores. Improvements in physiological and anthropometric measures are a positive result, even if not statistically significant, as the research discussed demonstrates that even small improvements are important to individual health, and better than no improvement at all (Chodzko-Zajko et al., 2009). The HCI have met their aim of engaging the participants for up to 12

weeks, with participants increasing their exercise and experiencing some physiological and anthropometric improvements, which will be beneficial to physical health (Chodzko-Zajko et al., 2009).

Psychometric measures

The psychometric measures assessed SOC, SD and SE. While the results are discussed here, the meaning of these results within the larger context of the program and corresponding qualitative results will be discussed in the following section, Participation: a convergent mixed methods approach.

Stage of Change.

No significant change occurred in SOC from assessment 1 to 2. The programs were not conducted with components tailored to the individuals' SOC. They were open to all who met the eligibility criteria, however, it is assumed that participants were at the preparation stage or higher to sign up and attend, and therefore participants were ready to begin or continue regular PA throughout the programs. At assessment 1, six (21%) of the participants were in the Action phase, and 16 (57%) of the participants were at the Maintenance stage, totalling 22 (78%) of the 28 participants. Only one participant was at the Contemplation stage assessment 1. It would be expected that those participants who completed the post-program questionnaire should be in Action or Maintenance stages, and this is reflected in the data, with 73% of participants in the Maintenance stage at assessment 2. A previous intervention named the SENIOR project (Greaney et al., 2008) targeted older adults at all stages of the SOC to try and increase PA and nutritional eating behaviours. The SENIOR project also found that those individuals who did complete the program were more likely to have been in the action or maintenance stages assessment 1 (Greaney et al., 2008). In the current study, all of the participants completed the program, even if they did not return their final surveys, thus supporting the SENIOR project's findings on completion rates (Greaney et al., 2008). A study by Kim (2007) looked at how psychological constructs of the SOC influence exercise behaviour, and found that SE scores were correlated with the different stages, with SE increasing as individuals

progress through the stages. These findings would suggest that SE scores of the participants in this study should be correlated with SOC.

Hypotheses were made that 1) an individual's SOC would be related to their exercise SE score and 2) an individual's SOC score would be related to their scores for exercise and treatment SD scores. SOC was not associated with participants' SE or SD scores. The non-significant result is not unexpected, with 57% of the participants at the maintenance stage at assessment 1 and 73% at assessment 2. With the higher percentage of participants in the maintenance stage, and the small sample size, there was much greater variance within the groups for SE and SD based on SOC, compared to between groups. It is still positive to note that there was an increase in the percentage in the maintenance group, as this means that there is a greater chance that more people will sustain PA behaviours as a result of the program (Bandura, 1998).

Self-determination.

It was hypothesised that scores on the SE scale, the Treatment Self-Regulation Scale (TSR-Q) and its subscales, and the Exercise Self-Regulation Scale (SRQ-E) and its sub-scales, would significantly change assessment 1 to assessment 2. The TSR-Q assesses motivation to participate in the program, and there was a significant improvement on the sub-scale autonomous regulation. Autonomous regulation is intrinsically regulated, as opposed to controlled regulation, which relates to pressure felt to meet the expectations of others. The development of autonomous self-regulation is important because it predicts exercise behaviour across various settings, and may assist in maintaining PA behaviour over time (Teixiera et al., 2012) Autonomous motivation also influences planning and self-monitoring (Nurmi, Hagger, Haukkala, Araujo-Soares & Hankonen, 2016), and is associated with a lower BMI and higher levels of moderate-to-vigorous PA (Friederichs, Bolman, Oenema & Lechner, 2015).

The increase in autonomous regulation is important because it means that participants are now more intrinsically driven to attend the program. Controlled regulation can be motivating, however, it should not outweigh that of autonomous regulation (Ingledew & Markland, 2008). Controlled regulation

remained steady for the current participants. This is not an undesirable outcome, as any form of motivation, including controlled, is thought to be better than no motivation. The study by Friederichs and colleagues (2015) discusses the role of controlled motivation in PA behaviour. They concluded that while those with autonomous motivation tend to have the more favourable PA behaviours, those with controlled motivation still do better PA-wise than those with overall low motivation because they are still engaging in the PA. Therefore, maintaining the current level of controlled motivation in this program is still a positive outcome for the participants.

While the TSR-Q addressed motivation to engage in the program, the SRQ-E examined motivations to exercise in general. No significant differences were found for scores on the SRQ-E for exercise, which indicates that there was no change in what regulates participants' motivations for general exercising from assessment 1 to assessment 2. While there is no obvious shift from extrinsic to intrinsic regulation, these results suggest only that their motivations for doing general exercise outside the program had not necessarily changed.

Self-efficacy.

Self-efficacy was measured at assessment 1 and 2 to determine if the participants developed a greater sense of control over their exercise habits (Bandura, 2004). While the total SE score was not significant and only increased from 44.29% to 50.55%, there are some interesting points to note in the individual barrier items. All but two of the items increased from assessment 1 to 2; therefore, the participants felt greater confidence at overcoming these barriers at assessment 2. SE, along with the other psychometric measures, will be discussed further in the following convergent mixed methods section.

The study aimed to find if SE, SOC and SD changed from assessment 1 to 2. It found that only autonomous motivation on the TSR-Q saw a significant result, however, there were still positive non-significant results measured. This result also indicates that participants did not have a negative experience that has discouraged them from exercising further beyond the program, as results did not suggest there was a decrease in any of the overall scores.

Participation: a convergent mixed methods approach

By examining the qualitative and quantitative results within the context of each other using a convergent mixed methods approach, a more comprehensive discussion of the overall experience of participation in a community-level health intervention can be illustrated.

Motivations to exercise.

Self-determination and autonomous motivation.

The qualitative results from the current study demonstrate that the participants were motivated to attend the program to socialise and were encouraged by the changes they felt in flexibility and functionality. These results suggest that the significant increase in autonomous regulation to attend the program could at least be partly due to these personal gains the participants had experienced, as well as the chance to socialise, resulting in participants wanting to continue attending. The non-significant increase in autonomous motivation to complete exercise in general suggests that while the participants became more internally driven to attend the program, this drive did not appear to generalise to other forms of exercise, meaning that when the program ends, they will not have increased their autonomous drive to undertake their own PA on their own. This is concerning because the qualitative research demonstrated that many were not undertaking their own PA, and therefore, when the program is over, they may not be motivated to continue exercising at the same rate as they were during the program.

The participants found the locations used were convenient for the program, but they did not use these facilities of their own volition, demonstrating that convenience means little if people are not motivated in the first place. A previous study by Costello, Kafchinski, Vrazel and Sullivan (2011) assessed residents of a complex who had easy access to quality fitness facilities, and found that only 10 to 15% of the residents accessed the facilities. Previous research examining the PA behaviours of older Australians found that the older Australians were more likely to be precontemplators compared to their younger counterparts, meaning that they were not even considering taking up PA (Booth

et al., 1993). PA programs need to address the likely chance that a high number of the target group will not be motivated to initiate any type of PA and provide tools to increase autonomous motivation for self-directed exercise for when the programs end.

Socialising.

A reoccurring reason given for participation was socialising. Several previous studies have demonstrated that socialising is a PA motivator (Allender et al., 2006; Baert, Gorus, Mets, Geerts & Bautmans, 2011; Belza et al., 2004; Bethancourt et al., 2014; van Stralen et al., 2009), and having physically active friends and family also increase the likelihood of engaging in PA (van Stralen et al., 2009). Kinnafick and colleagues (2014) found that social support enabled participants to adhere to a walking program, but only when they recognised that the support was available and made use of it. Social support as a motivator may therefore only be effective in situations where it is perceived, regardless of whether it is present or not. Social support positively reinforces PA behaviours, which in turn makes engaging in the behaviour reinforcing in itself (Carron et al., 1996). Future programs could use strategies to highlight how social support is available to participants, and how participants can support others, in order to increase overall participation in the program.

Physical benefits of exercise.

Participants reported that they were working to include more exercise in their lives for various reasons. PA was considered a protective factor for their health, whether physical or psychological. Twenty-four of the 25 participants interviewed considered themselves to be currently exercising, and the one participant who was not exercising understood that being inactive was a health risk. The sub-theme of 'Ability maintenance' in the theme 'Keep yourself' demonstrates participants exercise to maintain their current level of physical ability, supporting previous research that older, physically inactive individuals tend to engage in PA to maintain physical ability and slow the onset of age-related issues and chronic disease, rather than to greatly improve fitness or experience appearance gains (Allender, Cowbur & Foster, 2006; Benthancourt et

al., 2014; Chatfield, 2014; Crombie et al., 2004; McAuley, Elavsky, Jerome, Konopack & Marquez, 2005). This is important to note, because the initiative's promotional material did not focus on ability, but rather chronic disease prevention and structured exercise. Future programs could take into account that the older population may want to know how programs can help them maintain their current physical fitness and mobility, and how they can promote these benefits in the programs.

Enablers and Barriers.

The dividing of enablers from barriers is an artificial one, in that quite often they are both implicated in a situation. Barriers to PA must be overcome if the individual is to engage in and maintain regular PA habits (Bethancourt et al., 2014). Barriers have been shown to significantly impact upon an individual's ability to engage in PA, and therefore, understanding the barriers, so that strategies can be put in place to overcome them should be an important first step in any community-level initiatives for PA (Bethancourt et al., 2014). Perceived barriers can be overcome through a change of mindset, whereas actual barriers are those external to the individual's control, so the individual needs a strategy to overcome them. The main perceived barriers reported in 'Mindset' were the psychological characteristics of SE, motivation, enjoyment, excuses, and distrust of health messages. The actual barriers, found in 'Everyday life events and factors' and 'physical limitations' include the rural location, transport, weather, socioeconomic status, family and social commitments, as well as physical ability limitations. Strategies to overcome the barriers need to suit the particular challenges they present, as either perceived or actual. Some of the enablers discussed are specific to either the perceived or actual barriers, but quite often there is a complex interplay between the barriers and enablers.

Self-determination and intrinsic motivation as a barrier.

Under the sub-theme 'Mindset', five participants reported they lacked motivation, while another participant reported they will not exercise if there is no one there to 'prod' them. For these six participants, it suggests they are lacking intrinsic motivation, and rely on extrinsic forces to motivate them. With a

lack of improvement in intrinsic regulation for exercise in the quantitative results, it has to be questioned if the program has provided the skills necessary for participants to continue their own exercise regimen after the completion of the program. While the program did not specifically state that it was based on SD, there was the goal to engage people to help them create healthier eating and exercising behaviours that they would maintain long-term after the end of the program. This would indicate that the programs were designed to increase the participant's intrinsic motivation for healthy eating and exercising behaviours. It is recommended that studies in the future conduct long-term follow up data collection.

Health knowledge vs. behaviours as a barrier.

Also under Mindset, a distrust of general health recommendations promoted in the media was expressed, due to the contradictory nature of some of the recommendations, such as the nutritional recommendations regarding products such as butter and margarine. This distrust may have two potential disadvantages; firstly, that all health recommendations, including program recommendations, are disregarded without consideration, and secondly, that participants are then less likely to engage in the related health behaviour. A study by Nagler (2014) investigated the outcomes associated with exposure to contradictory nutrition messages in the media. It found that greater exposure to these contradictory messages was associated with increased levels of confusion about nutrition, which was linked to a greater backlash against these messages, and these were negatively associated with intentions to engage in positive health behaviours. This was found for health behaviours for which there was generally consistent evidence, such as eat enough serves of vegetables per day, as well as for the more controversial suggestions around items such as coffee, wine or fish. A consequence of this confusion was that people then doubted all nutritional advice, because they formed the impression that nutritional scientists often change their mind about healthy diets (Nagler, 2014).

In the current study there was a mismatch between what the facilitators felt the participants needed to learn and the participants' current health

knowledge. Facilitators had the opinion that participants did not know about the seriousness of chronic diseases, however participants demonstrated that they did know why they needed to exercise and eat well. Participants felt they just either did not have the motivation or they had other barriers in place. Therefore, it was more about their mindset, rather than knowledge.

Self-efficacy as a barrier.

Self-efficacy, or rather in this instance, lack thereof, can be a significant barrier to PA (Bandura, 1998). Looking at the quantitative survey results for SE as a barrier, "I felt pain or discomfort when exercising" and "my schedule conflicted with my exercise session" were the two barriers that participants scored lower in assessment 2 compared to assessment 1, meaning that at the end of the program participants had less SE for being able to exercise through pain, or a conflicting schedule. These two items were also reported in the participant interviews. Participants felt that family events and medical appointments were valid reasons for not participating in exercise. Under the sub-theme 'Everyday life events and factors' participants discussed how they recognise pain that could cause them greater health problems if they pushed through, including angina attacks, a chronic fatigue syndrome flare, and an ulcerative colitis flare. These results support previous research that has identified common barriers to exercise. One study examining barriers in an older adult population found that lack of time and the potential for injury were two barriers found in both physically active and inactive groups (Costello et al., 2011). Amongst physically inactive adult Australians, 'lack of time' was the most commonly mentioned barrier to exercise, from almost 40% of all respondents. Approximately 5% of the respondents feared injury, and more than 20% had an injury they felt prevented them from exercising (Booth, Bauman, Owen & Gore, 1997). A qualitative study assessing barriers and facilitators of a PA program for older adults similar to the programs in the current study, found that risk of injury and increased recovery time were barriers to exercise (Bethancourt et al., 2014). To successfully engage individuals in exercise these common barriers must be acknowledged, and solutions discussed.

In the SE scale, overcoming the barriers of accessing the location, bad weather, and personal stresses, were the items that saw the least amount of improvement from assessment 1 to 2, demonstrating that perhaps the most difficult barriers to overcome are the actual ones of routine and access to locations, weather, and lack of available organised PA, rather than the perceived mindset barriers. The actual barriers found in this study have also been highlighted in previous qualitative research on barriers to exercise (Bethancourt et al., 2014; Booth et al., 1997; Costello et al., 2011). The personalised instruction provided in the programs, whereby exercises were tailored to the individual's requirements and ownership of those exercises evolved, enabled the development of SE and motivation to be able to continue exercising on their own through mastery experiences (Bandura, 1998). By bringing the program to the people at convenient locations at low or no cost, it effectively engaged participants at local facilities that they would otherwise not use. For participants, the program was the catalyst, or enabler, to get into regular exercise, for at least the duration of the program. Identifying why participants engaged with the program can therefore inform the design of future programs on what to include and promote.

Self-efficacy as an enabler.

Higher SE can be an enabler for PA behaviours (Bandura, 1998). SE scale items that saw the greatest score increases were (I feel I could still exercise if…) "I had to exercise alone"; "An instructor does not offer any encouragement", and; "I felt self-conscious about my appearance when I exercised". While there were no significant quantitative results from assessment 1 to 2 for SE for the group overall, the qualitative data suggests that some participants did experience an increase in SE.

The theme Observed Changes discusses how some participants felt they were getting fitter and were pushing themselves further. With these improvements, participants had greater SE for exercise, as they were now able to achieve more physically. Bandura's (1998) SCT suggests that one of the most effective ways people can develop SE is through 'mastery experiences', where the

person undertakes an activity and is successful, proving their capability to themselves. The more the activity is undertaken, SE as an enabler can develop. The participants of this study had either ten sessions in the water aerobics program or 24 sessions in the Beat It program. They experienced physical improvements, saw their improvements from assessment 1 to 2 in the physical ability measures, and had several opportunities to practice and master experiences in the pool. 'Vicarious experiences' is another way Bandura (1998) suggests individuals can develop SE, by watching people similar to them master an activity or skill. The cohorts of participants provided opportunities for this to occur. A meta-analysis that assessed the best ways to change exercise SE found that interventions that provide vicarious experience opportunities and those that provided success feedback improved SE (Ashford, Edmunds & French, 2010).

Program as an enabler.

For the Health behaviours enablers theme, the two subthemes were 'supportive others' and 'the program and its setting'. The program facilitators were a PA enabler for some individuals. This has been demonstrated in previous research (Bethancourt et al., 2014) where by facilitators have been shown to be important motivators (Costello et al., 2011). The participants appreciated the instructions and demonstrations from facilitators, as well as their encouragement and ability to modify tasks to the needs of the individual. The facilitators of the programs used the pools to provide personalised exercises for each individual's ability, and the non-weight bearing activities were an enabler for some participants. The program provided facilitators the opportunity to provide positive feedback on the individuals' progress and show them how much their health has benefited from the exercise. Positive feedback from facilitators has been shown to increase SE for inactive females (McAuley et al., 1999).

The facilitators are there to help participants establish healthy and practical routines that they can maintain themselves post-program, and provide them with the skills necessary to do so. If the facilitators do not have an understanding of what the participants need to achieve this, then programs may

not be as effective as they can be. Overall, the facilitators did appear to have a rather comprehensive idea of the participants' perspectives, however, they may have underestimated the participants' knowledge of positive health behaviours. There was also the suggestion that participants may be shy about their physical ability or looks. This does not seem to match the attitude of the participants though, as they did not mention this.

Another participant reported that the presence of the programs, featuring non-competitive PA, was an enabler in itself, with a lack of available organised exercise programs in the area being a barrier to PA engagement. The finding that the availability of a program is an enabler supports previous research. Bethancourt and colleagues (2014) found that a group setting providing social interactions and fun facilitators were attendance enablers, and therefore PA enablers, for a cohort of older participants. In turn, lack of enjoyment of the activity was a barrier for some (Bethancourt et al., 2014). In the current study it is encouraging to see that the items on the SE scale relating to enjoyment and interest increased from assessment 1 to 2. This finding supports previous research where not utilising available exercise opportunities was due to the main barriers of no time, risk of injury, lack of self–discipline or motivation, as well as boredom and intimidation (Costello et al., 2011).

Family support was a key enabler for some participants to be able to engage in the program or exercise at home. Previous research has demonstrated how people tend to influence the eating and exercise habits of those they live with (Umberson, Crosnoe & Reczek, 2010). The participant's recognition of available support contributes to the adherence to new exercise behaviours (Kinnafick et al, 2014). Some participants in the current study attended the program to support their partner. Previous research has also found that individuals have begun exercising in support of their partners or friends (Costello et al. 2011). Future programs could enable participation by using these findings in their engagement and retainment strategies, for example subsidised sessions for a friend or partner, or two-for-one deals.

General practitioner's promotion of programs motivated and enabled participants to exercise. Previous research demonstrates some patients can feel that not all GPs are comfortable with talking to them about weight related issues, or appear to not know what exercise would be suitable, and patients can be unsure about broaching the topic (Costello, Leone, Ellzy & Miller, 2013). In small communities with limited health and social networks, the local GP is often the primary health contact for general health behaviour advice. General practitioners can also be important for assistance with overcoming physical limitations to exercise. Booth and colleagues (1997) found that older inactive Australians generally wanted advice and support from their GPs about PA activities. This important relationship needs to be promoted as an important source of health information when participants have lost faith in other sources, such as the media reporting on nutrition science (Nagler, 2014). While each individual's circumstances are unique, if those in a position are able to assist, such as GPs, facilitators, family and friends, to help individuals identify and then tackle these issues, the individuals may have a better chance at overcoming the barriers.

Exercise to me.

The theme of 'Exercise to me' revealed that an individuals' definition of exercise changed depending on their physical ability. For those participants with limited mobility, doing household chores such as hanging washing on a line was considered exercise, because it was physically challenging for them. Those participants with better physical ability described exercise in the 'traditional' terms of swimming, tai chi and other activities performed to improve fitness.

The difference in personal definitions of exercise could have implications for the accuracy of population surveys, and relevance to health education and promotion. Individuals may not realise they are not reaching the minimum exercise guideline benchmark recommended to benefit their health. van Stralen and colleagues suggest that individuals may be unaware of their insufficient PA levels, therefore making people aware could be an important step for PA engagement (van Stralen et al., 2009). Current Australian PA guidelines promote

PA to improve health, and state that incidental PA will contribute positively to health. The guidelines suggest people should find PA that they enjoy, rather than exercising just for the purpose of exercising (Department of Health, 2014).

What "Exercise to me" means for the Stage of Change results.

The SOC measure may be an inaccurate measure of exercise behaviour due to the different personal definitions of exercise, as explored in the theme 'Exercise to me'. The questionnaires distributed asked to what degree did participants exercise, without providing an explicit, detailed description of exercise, which in hindsight, was a limitation for the current study. Participants therefore filled them out using their own definitions of exercise, anything from hanging out washing to strenuous PA. For the SOC scale there was only one participant in the contemplation stage (where they currently did not exercise but are thinking to start), however, the qualitative data indicates that this is not the case, with several individuals not engaging in at least some sporadic exercise. This has implications for all studies that investigate levels of exercise, especially when they do not specifically provide a definitive definition of exercise. Issues with self-report exercise scales have been discussed in previous research, such as the inability of some to distinguish between intense and light exercise, and over-reporting of exercise habits (Shephard, 2003). This study demonstrates that ideas about what constitutes exercise changes from person to person, so unless it is explicitly detailed in the questionnaires, responses will most likely continue to be an inaccurate representation of exercise levels.

Summary, Recommendations, Limitations and Conclusions

Factors that can impact upon our physical health and wellbeing include diet, PA, smoking, alcohol intake behaviours, as well as mental health status, socioeconomic status and BMI. Physical inactivity is the cause of 6% of deaths worldwide, the fourth highest risk factor for mortality (WHO, 2012). Only 43% of Australians participate in the recommended amount of weekly exercise and 20% do not engage at all (ABS, 2013). Australians also do not meet healthy eating guidelines, with only 6.8% of individuals meeting the recommended vegetable intake (ABS, 2015b). Rates of smoking in the Australian population have fallen to

12% in 2016 (AIHW, 2018c), however, it is still the leading cause of preventable death and disability (Department of Health, 2018b). Alcohol use is ingrained in Australian culture (Allan et al., 2012), despite it costing the government $14.352 billion in 2010 (Manning et al., 2013). Obesity is a cause for concern for both the individual's health, as well as the health care costs at the national level (Chan, 2012), with 63.3% of Australians either overweight or obese in 2014-2015 (ABS, 2015a).

The Australian government provided 82 local government areas around the country with funding for HCI that aimed to improve the PA and dietary behaviours of the participants. Wellbeing Tablelands was conducted by the Tablelands Regional Council. Two of the programs included were water aerobics classes. The first was Beat It, which was a water aerobics program that featured a small amount of nutritional information. The second program was a lighter water aerobics class that catered to older adults with less physical movement and strength. The participants for this thesis were from these two programs. To date, there has been a lack of research regarding the personal experiences of participation in community-level health interventions. This thesis aims to detail the personal experiences of participation, how this participation impacted upon their health behaviours, and what the facilitators' perceptions were of participation. A convergent mixed methods approach was used to explore the experiences of participation from the point of view of both the participant and the facilitator, and to examine how physiological and psychological characteristics changed from assessment 1 to 2.

SOC, SE and SD are three psychological variables that could contribute to an individual's adoption of a new health behaviour. SOC is a part of the TTM, which suggests that the likelihood of an individual adopting a new behaviour is dependent on what stage they are at (Prochaska & DiClemente, 1983). SE, from SCT, is the individual's belief that they are able to successfully undertake a task (Bandura, 2004). SDT suggests that behaviours are performed because the individual is motivated to do so, either through intrinsic or extrinsic motivation (Ryan & Deci, 2000). These three psychological models have been utilised in this thesis, with questionnaires for each completed set of assessments 1 and 2. SOC

was measured using a five-point scale from precontemplation through to maintenance, based on Prochaska and DiClemente (1983). A modified version of McAuley's (1992) SE scale was used to measure SE for exercise. SD was measured using two scales, the TSRQ (Levesque et al., 2007) and the SRQ-E (University of Rochester, 2013). Physiological and anthropometric measures were also taken at assessment 1 and 2.

Significant improvements from assessment 1 to 2 for the anthropometric changes include reductions in WC for both males and females and a reduction in the males' BMI. There were also significant improvements for women's flexibility and lower body muscle endurance and for the male's upper body muscle endurance. For the psychological results, the only significant change was for the autonomous subscale on the TRSQ. Therefore, participants felt more intrinsically driven to attend the program.

A limitation for both the anthropometric and psychometric data is that this data was collected in the first few weeks (1 to 4) of the program, and not before the program started. This would have reduced the time the program had to influence outcomes for some of the participants' data points, and the program itself may have already impacted the assessment 1 scores, lessening the difference produced. There were also small sample sizes, with multiple statistical analyses carried out using these limited numbers. Conducting multiple statistical analyses does increase the likelihood or committing a Type 1 error. Not having a control group for the quantitative data was also a limitation, along with not taking into consideration potential covariates such as accounting for amount of PA participants may have been undertaking in their own time.

This study used Braun and Clarke's (2006) Thematic Analysis to examine the personal experiences of participation in the HCI. Inductive coding was used for the participants, and therefore there were no set codes or questions to answer. Deductive coding was used for the facilitator interview coding, as it needed to be determined if the facilitators' perspectives correlated with those of the participants.

For the participant results, the five main themes found were 'Exercise to me', 'Physical benefits of exercise', 'Psychological benefits of exercise', 'Health

behaviour barriers' and 'Health behaviour enablers'. Socialising was the only benefit of exercise that every participant mentioned, and this occurred without any prompting from the researcher. They either felt that it was a benefit of attending, or it was the reason that they attended the program. An increase in SE was also noted in some of the participants, as they felt that they were able to complete more exercise tasks as a result of participation. The facilitator results demonstrated that the facilitators did appear to understand what some of the barriers and enablers for participants were. These included the presence and low cost of the programs, the support of their doctors, socialising and positive impressions of the program.

The findings from this study highlight key points that could be applied to future programs:

1) Social support opportunities: Demonstrate how social support will be available to prospective participants, and work with them during the programs to identify how they access and engage with social support after the program ends. Programs could use the social connections to actively foster the creation of social groups and problem solve with the group ways they can overcome barriers to PA once the program is over. From piquing a potential participant's interest with the possibility of making new acquaintances, to creating social groups that will survive the end of the program, social interaction and support can be utilised throughout programs as a compelling PA enabler.

2) Ability maintenance: while chronic disease prevention and management is often the focus for the facilitators and program providers, participants are more interested in how the program can positively impact them in the present. This theme encompasses two main points; that participants are encouraged by results they see quickly, and by results that are meaningful to their daily lives. The goal of chronic disease prevention does not necessarily meet these two points. The inclusion of more relatable outcomes should be included in promotional material, with strategies tailored to the age and/or ability group the program is targeting. There could also be a focus on integrating exercises that focus on specifically on ability maintenance, such as flexibility and strength.

3) Intrinsic motivation: Intrinsic motivation is the motivation that makes people want to engage in PA, which means that it can be the difference between whether someone does PA or not. A focus on promoting intrinsic motivation during program participation through avenues such as positive reinforcement, and regular feedback on noted improvements or achieved mastery experiences, will help people to continue engaging in PA beyond the program. Demonstrating how participation also enables ability maintenance could also foster intrinsic motivation.

4) Facilitators' awareness of barriers: Facilitators have the potential to be one of the greatest supports at a program. They can help participants overcome barriers, as well as foster the development of intrinsic motivation. For this to be possible, they must be aware of the barriers pertinent to their participants. Time should be spent trying to learn the barriers and devising strategies with participants for them to overcome these, so that PA is more likely to continue after the program concludes.

Recommendations for future research are:

1) Qualitative research investigating the personal experience of participation in community-level health interventions should continue to be conducted across different cultural, socioeconomic and geographical cohorts to further develop understanding of participation across different populations. The qualitative research enabled a greater insight into psychometric factors than the objective quantitative assessments did.

2) Assessing how the individual definition of exercise changes across populations, and how this could be addressed in health promotion literature.

3) Longitudinal research that examines the long-term impact of the programs on behaviour change, to see if positive changes are maintained in the years afterwards.

Conclusions.

This research can inform our understanding of the motivations of residents to participate in these initiatives, and has implications for the design of

community health programs which best meet the needs of all potential participants. Those living in rural locations have limited access to public amenities and resources, or organised programs, and therefore exercise programs that are available should be as inclusive as possible, and offer services that would otherwise not exist. This study provides a description of the experience of participation in a rural location, from a heterogeneous participant group of different ages, physical abilities and psychological profiles. It demonstrates that despite the participants' heterogeneity, socialising was important to all and ability maintenance important to most. This was in contrast to reducing chronic disease risk and improving general health behaviours, which were the aims of the programs (Department of Health, 2012). It was through meeting their desires for social interaction and maintaining ability that they inadvertently addressed chronic disease risk and health behaviour improvement through exercise.

These results suggest that programs targeting physical ability maintenance, that are flexible enough to meet the needs of the individual and provide an opportunity for socialisation, will appeal to an older target audience.

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Appendix A: Informed consent form

This administrative form has been removed

Appendix B: Exercise self-efficacy scale

Rate your answers to the statements along the scale with a circle or cross

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
NOT AT ALL CONFIDENT				MODERATELY CONFIDENT						HIGHLY CONFIDENT

I BELIEVE I COULD EXERCISE IF:

1) The weather was very bad (hot, humid, rainy, cold)

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

2) I was bored by the program or activity

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

3) I was on vacation

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

4) I was not interested in the activity

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

5) I felt pain or discomfort when exercising

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

6) I had to exercise alone

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

7) It was not fun or enjoyable

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

8) It became difficult to get to the exercise location

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

9) I didn't like the particular activity program that I was involved in

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

10) My schedule conflicted with my exercise session

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

11) I felt self-conscious about my appearance when I exercised

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

12) An instructor does not offer me any encouragement

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

13) I was under personal stress of some kind

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Appendix C: Stage of change questionnaire

Instructions: Please tick beside the statement relevant to your exercise habits.

Tick	
	I currently do not exercise and do not intend to
	I currently do not exercise, but am thinking to start
	I currently exercise some, but not regularly
	I exercise regularly and have begun in the last six months
	I exercise regularly and have been doing so longer than six months

Appendix D: Exercise self-regulation questionnaire

Instructions: Score from 1 to 7, with 1 = NOT AT ALL TRUE, 4= SOMEWHAT TRUE and 7 = VERY TRUE

I try to exercise on a regular basis because:	Not true → True
I would feel bad about myself if I did not	1 2 3 4 5 6 7
Others would be angry at me if I did not	1 2 3 4 5 6 7
Because I enjoy exercising	1 2 3 4 5 6 7
Because I would feel like a failure if I did not	1 2 3 4 5 6 7
Because I feel like it's the best way to help myself	1 2 3 4 5 6 7
Because people would think I'm a weak person if I did not	1 2 3 4 5 6 7
Because I feel like I have no choice about exercising: others make me do it	1 2 3 4 5 6 7
Because it is a challenge to accomplish my goal	1 2 3 4 5 6 7
Because I believe exercise helps me feel better	1 2 3 4 5 6 7
Because it's fun	1 2 3 4 5 6 7
Because I worry that I would get in trouble with others if I did not	1 2 3 4 5 6 7
Because it feels important to me personally to accomplish this goal	1 2 3 4 5 6 7
Because I feel guilty if I do not exercise regularly	1 2 3 4 5 6 7
Because I want others to acknowledge that I am doing what I have been told I should do	1 2 3 4 5 6 7
Because it is interesting to see my own improvement	1 2 3 4 5 6 7
Because feeling healthier is an important value for me	1 2 3 4 5 6 7

Appendix E: Treatment self-regulation questionnaire

Instructions: Score from 1 to 7, with 1 = NOT AT ALL TRUE, 4= SOMEWHAT TRUE and 7 = VERY TRUE

I decided to enter this weight-loss program because:	Not true → True
I won't like myself very much until I lose weight.	1 2 3 4 5 6 7
People will like me better when I'm thin.	1 2 3 4 5 6 7
It feels important to me personally to be thinner.	1 2 3 4 5 6 7
I really want to make some changes in my life.	1 2 3 4 5 6 7
If I remain in treatment it will probably be because:	
I'll feel like a failure if I don't.	1 2 3 4 5 6 7
People will think I'm a weak person.	1 2 3 4 5 6 7
I'll feel very bad about myself if I don't.	1 2 3 4 5 6 7
Others will be angry at me if I don't.	1 2 3 4 5 6 7
I feel like it's the best way to help myself.	1 2 3 4 5 6 7
I plan to lose weight because:	
I'll be ashamed if I don't.	1 2 3 4 5 6 7
I'll hate myself if I can't get my weight under control	1 2 3 4 5 6 7
My friends/family don't like the way I look.	1 2 3 4 5 6 7
Being overweight makes it hard to do many things.	1 2 3 4 5 6 7
I have agreed to follow the procedures of the program because:	
I am worried that I will get in trouble with the staff if I don't follow all the guidelines.	1 2 3 4 5 6 7
I'll feel guilty if I don't comply with all the procedures.	1 2 3 4 5 6 7
I want others to see that I am really trying to lose weight.	1 2 3 4 5 6 7
I believe they will help me solve my problem.	1 2 3 4 5 6 7
It's important to me that my efforts succeed.	1 2 3 4 5 6 7